

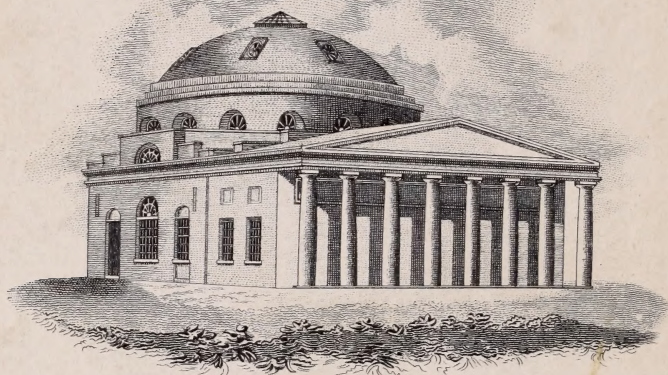
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THE
ECLECTIC REPERTORY,

AND
ANALYTICAL REVIEW,

Medical and Philosophical.

EDITED BY A SOCIETY OF PHYSICIANS.

..... Apis matinae
More modoque.—HOR.

Nullis unius disciplinae legibus adstricti, quibus in philosophia necessario paremus, quid sit in quaque re maxime probabile semper requiremus.—CIC.

VOL. III.

PHILADELPHIA:
PUBLISHED BY THOMAS DOBSON,
AT THE STONE HOUSE, NO. 41, SOUTH SECOND STREET.
William Fry, Printer.
1813.

Cordell
Hist.
Coll

33410

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THE
ECLECTIC REPERTORY

AND
ANALYTICAL REVIEW.

VOL. III.

OCTOBER, 1812.

No. I.

SELECTED PAPERS.

*Of the Soil and general state of Health, in different parts of
North Carolina.*

THE following extract from "The History of North Carolina, by Hugh Williamson, M.D. LL.D. Member of the Holland Society of Sciences, of the Society of Arts and Sciences of Utrecht, of the American Philosophical Society, &c. in two volumes," recently published by Thomas Dobson, Philadelphia, will be read with interest, and we hope may excite some of our medical brethren to give us similar accounts of the respective states in which they reside.

"The climate of North Carolina is usually thought to be unhealthy; but this character is not applicable, except to the eastern part of the state; the part that is best known to strangers, and most frequented, because it is intersected by navigable rivers, and is the general seat of commerce. Other parts of the state are exceedingly healthy. By taking a short view of the face of the country, we shall immediately perceive the cause of this remarkable difference.

Carolina is a perfect plain for sixty miles from the Atlantic ocean, without hills or stones. It has been covered by water, at no great distance of time. Beds of oyster shells and other marine exuviae, are found near the surface, in many parts of the

flat country. Those concretions of shells are burnt for making lime. The gulf stream runs along the coast, within six or seven leagues of the shore. The soundings change suddenly at the edge of the gulf stream, for the margin is nearly a perpendicular bank. A great fissure, nearly in the direction of northeast and southwest, has been made in the bottom of the ocean, by some convulsion of nature.* Such at least appears to have been

* The lacerated and irregular state of the different strata that are found to the eastward of the Appalachian mountains, is in proof that earthquakes or volcanic eruptions have been frequent there. The strata of limestone, for instance, are observed, in every case, to dip or make an angle of thirty-five to forty-five degrees with the plane of the horizon. In the western country, the case is different. The strata in those regions, are generally unbroken, and they lie parallel to the plane of the horizon. Hence it is, that rivers in the western country are observed to increase more by a moderate fall of rain, than on the hither side of the mountains: the greater part of the rain is there prevented, by the unbroken strata, from sinking into the earth. It seems probable, that the abundance of salt springs that are found on the western side of the mountains, is also to be accounted for by keeping in mind the cause of this remarkable difference in the texture of the earth.

A small explosion of a volcanic nature, was observed about the year 1793, in Anson county.

In the year 1794, a remarkable subterranean wall was discovered, about twelve miles from Salisbury, in Rowan county. This wall is nearly parallel to a small rivulet, at the distance of thirty or forty feet, from which the ground rises on both sides by a moderate slope. There is a clear field adjoining the rivulet, and the water that ran across the field in heavy rains, caused a gully, by which the top of the wall was exposed to view. People have traced the wall about three hundred feet. It is twenty-two inches thick, and the top of it is, in most places, from two to six feet below the surface of the ground. But as the ground rises considerably in one place, the wall rises at the same place, so that one part of it is fifteen or twenty feet above the level of another part. It is perfectly straight, except that in one place there is a circular offset of about six feet; after which, it is continued in its former direction. Some people have dug ten or twelve feet by the side of the wall, without finding its bottom, or any alteration in its form. The stones of which it is composed, are all of one kind, of a dark colour, containing iron. They are fusible without addition. In the formation of this wall, there are not any large stones. Few of them weigh so much as twelve pounds. The outside stones are mostly of an oblong figure; seven or eight inches in length. In all cases they lie across the wall. The inside of the wall is composed of stones of every shape. All the stones seem to be bedded in mortar; and the outside stones, that are flattish, are laid upon one another with much apparent care. When they do not exactly fit, there seems to be a small fragment of a stone wedged in, so as to fill the space. The mortar resembles putty

the case. The ground rose to the northwestward of the chasm, and sunk to the southeastward. The sandy bottom of the sea, by this elevation to the westward, was converted into dry land. In this case, the rivers coming down from the original dry land, made a crooked path for themselves through the sandy plain. Those rivers had little descent; wherefore, in their tardy course, they deposited the vegetable mould that came down from the higher grounds. In some cases, the sandy plain had been depressed five or six feet below the level of the common surface. In those parts, it must have happened that ponds of stagnant water were formed, until the sunken ground was filled up by vegetable mould. By this hypothesis we are enabled to explain all the present phenomena of the flat country. In some parts we find large sandy tracts, perfectly level, that hardly contain

to the touch, having no mixture of sand. In some places the mortar is found to be an inch thick, where the stones do not exactly fit one another. The wall seems to be plastered on both sides with the same kind of mortar. The earth on both sides of the wall seems to be factitious, being composed of sand and pebbles. It becomes harder the further down they dig.

Is this wall natural or artificial? Some gentlemen presume that it is a basaltic eruption, and their opinion is founded on the quality of the stones, and on the circumstance of its being a great work of no use. But if it is basaltic, it differs from every thing of the kind we have seen recorded. Instead of perpendicular columns, as in the Giant's Causeway, and many other productions of the kind, it chiefly consists of flat stones parallel to the horizon. Instead of parts that fit one another exactly, with a simple intervening crack, here are pieces that seldom fit, the intervening space being filled up by a soft substance. The thickness of that cement does not suffer us to call it a rust, although from its chemical qualities it might pass for a spontaneous decomposition of the stones. The uniform thickness of the wall has also been deemed unfavorable to the idea of its being the work of nature. But we gain little in shunning a difficulty, when we allege that the wall is the work of art. To suppose that any body of men performed a toilsome and difficult work, that could be of no possible use, would be to charge them with pure madness. And the folly of building a naked straight wall, in a low piece of uneven ground, seems to beggar description. A lesser wall has since been discovered, at the distance of five or six miles. It has been traced fifty or sixty feet. It is only seven inches thick, and all the stones reach quite across the wall. Those walls are probably of the same date.

We are not allowed to deny the existence of those walls, although we find some difficulty in accounting for some of the present phenomena. But the use of Stonehenge in Salisbury is luminous, compared to the Salisbury walls when they are ranked among the works of art.

any mixture of clay or vegetable soil. The growth is pine or black jack. In other parts the land is of an excellent quality, with a stiff clay bottom. Those lands are low; and in many places they require draining. The rivers are bordered by a strip of land that is lower than the common surface of the country. Those river lands are exceedingly rich; for they consist of vegetable mould, three or four feet deep, with a small mixture of sand or clay. In many places those river lands are three or four times the breadth of the river. There are other large tracts detached from the rivers in which the soil is nearly of the same quality with that of the river lands. But it is seldom mixed with sand or clay. In those tracts the vegetable soil is commonly five or six feet deep, and the whole of it is saturated with water. Such are the Dismals, so called, and the other great swamps that are numerous in the flat country. Supposing as above, that the original surface, where the swamps are found, had been covered for many years with stagnant water, because it was somewhat depressed, it would follow, that the chief rivers at every great fall of rain, must have thrown part of their turbid stream into those stagnant ponds, until they were so filled with adventitious soil, as to produce reeds and other aquatic plants. The luxuriant growth in those swamps, in the progress of time, caused the surface to rise; so that in many cases it is higher than the adjacent sandy and dry plain. Some of those swamps are fifteen or twenty miles in diameter, and they are chiefly covered, at present, with a thick growth of cypress* or juniper.† In some parts they are covered with maple,‡ poplar,§ and white oak,|| intermixed with tall reeds, magnolia,¶ and green briars.

The soil increases every year by the addition of decayed vegetables; but the water is detained by the leaves and the roots of trees, so as to have little motion, though the surface has become much higher than the water in the adjacent rivers.

* *Cupressus disticha*, foliis disticis patentibus.

† *Cupressus tryoides*, foliis imbricatis frondibus ancipitibus.

‡ *Acer rubrum*.

§ *Arbor tulipifera Virginiana*.

|| *Quercus alba Virginiana*.

¶ *Magnolia glauca*, foliis oblato oblongis, subtus glaucis.

Some years ago, Mr. Josiah Collins of Edenton, and one or two other gentlemen, projected a canal, about five miles long, through a swamp of this kind, in Tyrrel county, that was chiefly covered with stagnant water. Their original object was to drain a lake that is eight or nine miles long, and nearly of the same breadth. Upon making a survey, it appeared that the water in the lake was three feet higher than the richest part of the swamp, and the surface of that swamp was seven feet higher than the water in the nearest river. By that survey it was discovered that they were in possession of an excellent rice swamp; above ten thousand acres in one body, that may be covered at pleasure with fresh water, eighteen inches or two feet deep. By finishing the canal, and erecting three or four mills, that are turned by the waters of the lake, and by raising a few crops of rice and wheat, they have shown that lands, formerly of little value, may be made the most profitable lands in the state. The rice produced on those lands is not exceeded in quality by any rice in Georgia or South Carolina. Mr. Collins, to vary the crop, has occasionally sown part of those lands with wheat, and they produce thirty-four to thirty-five bushels per acre.

In digging the canal from the lake to the river, many large trees were found in a state of good preservation, though they had been covered, four or five feet deep by vegetable soil. A clear indication of the manner in which the soil has been formed.

It is conjectured that the swamps, within forty miles of the coast, do not occupy less than a fifth part of the surface. It will readily be perceived, that so large a quantity of stagnant water among putrescent vegetables, must be unfriendly to the health of the inhabitants. Intermitting fevers are very frequent in the summer and autumn; but fevers with inflammatory symptoms, that have a putrid tendency, prevail in the winter. The progress of time and cultivation of the soil, cannot fail to make a considerable change in the climate, in the flat lands of Carolina. And the effect of that change must be favourable to the health of the inhabitants. The natural operations of time would reduce those extensive and numerous swamps, to the condition of firm and dry land; but this event must be greatly accelerated by the progress of cultivation. The subsidence of water is very observable, in many parts along our coast. Where

the lands are high, this circumstance has been little observed; but in flat countries, where the water is troublesome, it claims more attention. There are considerable tracts, now planted with corn, that, in the beginning of the eighteenth century, were covered by water. This was not the effect of drains or ditches; it was caused by the waters sinking in the adjacent rivers or sounds. There are two causes that equally contribute to the failure of water in the low country;—the cultivation of the interior lands, and the regular subsidence of water in the ocean. Most of the large rivers in Carolina discharge themselves into a sound, that communicates with the Atlantic by small inlets. The water in the sound is nearly fresh; it is perfectly fresh in the rivers. These rivers have no tide, and they have little motion through the whole of the flat country. The waters are observed to swell in the rivers and in the sound by a heavy fall of rain. From this circumstance we infer, that every decrease of rain will be attended by a decrease of water in the rivers, and by a consequent decrease of water in the sound. The general decrease of rain is easily accounted for by the progress of cultivation. We account, in the same manner, for the decrease of fresh water in all our rivers. As the waters decrease or sink, the lands appear to rise, and the marshes, that communicate with the rivers, become dry land; except in cases where a level surface and thick growth prevent the rain-water from running off. The decrease of the rivers, from this cause alone, with the aid of ditching and draining, would soon reduce all the great swamps to the condition of arable land. But there is another cause that co-operates with the decrease of river water. The waters on the coast are supposed to sink. We have no solid marks on our coast, by which we can estimate the accidents of ocean water; but we allege the general subsidence of the ocean here, from what is observed in other countries. The inhabitants of West Bothnia have observed, by marks on the rocks, that the sea decreases four inches five lines every ten years, or forty-four inches and two lines every century. Dalen calculates, that the waters in Sweden sink thirty-seven inches in one hundred years. Ravenna, in Italy, is no longer a sea-port. There seems to be good evi-

dence, that a direct communication by water formerly existed between the Baltic and the Euxine or Black Sea.

Herodotus alleges, that great part of Poland and Russia had been covered by water. And Orpheus, in his *Argonauts*, supposes that one might sail from the Euxine to the Baltic. There must have been a tradition, that such a passage had formerly been effected. Ptolemy speaks of Scandinavia as an island. Homer describes the island of Pharos as a day's sail from Egypt; and we know, that the present city of Alexandria is built on the very spot that was the original harbor of the old city. This remarkable subsidence of the ocean has been accounted for by different theories; none of them, as I think, satisfactory. It is not to be supposed that the bed of the ocean is deepened by the attrition of the water; for more earth or clay is doubtless brought into the ocean by rivers, than is taken out of it by other means.

There may be caverns in the earth by which water is occasionally absorbed. Islands have been raised in the ocean by the help of subterranean fire. A small one has lately been added to the Azores; but the space, they formerly occupied, does not contain much water. When we consider the numerous and frequent volcanic eruptions that have appeared in the great chain of islands that extend through the Pacific ocean, near the equator; the numerous eruptions that have appeared in the Cordillera of the Andes; and the constant flames that appeared in Greenland and other high latitudes, giving light and heat to those frozen regions; we must suppose that the earth abounds in caverns whereby water has been absorbed. But we are also to consider that dry land has disappeared or sunk in different parts of the world; and the absorption of water by volcanic eruptions is neither great nor regular.

There is another process by which, as I conceive, the decrease of water may be accounted for. It is the regular and constant conversion of water into shells, madrepores, and corals. Fixable air abounds in water, by means of which it unites with calcareous bodies. Corals and other substances, formed by this union, are specifically heavier than water, nearly as two and a half to one.

We do not pretend to know, by what process certain animals

or insects in the ocean cause the formation of shells, madrepores and corals from water, or from earth and air that are attached to water and seem to be part of that fluid; for they increase its bulk; but the process is constant. The shells that appear in shallow water, on our coast, are of little importance; but the madrepores and corals, formed in the ocean, are of prodigious magnitude. We are told, by late navigators, that in some parts of the South Sea navigation is become dangerous; and in other parts it is absolutely impracticable, by the formation of great ledges of madrepores or corals, where the water had been very deep. When we consider that more than two inches of water are required to form one inch of those weighty substances, we shall discover a probable cause for the subsidence of ocean water. Whatever the case may be, it can hardly be doubted, that the ocean is retiring from the land, or decreasing in depth. Nor is it to be doubted, that the quantity of water discharged by the rivers in Carolina, and in every new country, is decreasing every year. It must inevitably follow, from one or both of these causes, that the marshes or swamps in Carolina will soon disappear. The progress of agriculture is a steady auxiliary to the operations of nature in producing this desirable change. It is already discovered, as we have seen, that marshes are drainable; and the soil, when fitted to the plough, is excellent in quality. In process of time all those swamps will be cultivated.

Intermitting fevers are the usual complaints in the eastern part of Carolina. Those fevers seem to arise, as we have already observed, from the exhalations of stagnant water or putrid vegetables. They prevail more or less, according to the quantity of water that is exhaled, impregnated with putrescent vegetables. All our observations tend to confirm this opinion. When stagnant water is not exhaled, intermitting fevers are less prevalent. When putrescent vegetables are exposed to the action of the sun, intermittents are frequent. In the midst of great forests, the sun never visits the surface; his rays being fully intercepted by a thick growth of cypress, juniper, magnolia, and reeds. Intermitting fevers do not prevail in such places. Families who live in the Dismals, employed in making shingles, without a perch of clear or dry ground, enjoy more

health than people who live on their new plantations, near the rivers or swamps. The bad effect of recent cultivation, by which decaying vegetables are exposed to the sun, is severely felt in flat countries and warm climates. Carolina was less sickly before the country was opened. The second colony of adventurers remained twelve months in the country, and they lost only five men out of one hundred and seven, though they were badly sheltered, and suffered much by the scarcity of provisions. A gentleman in Craven county lived on his farm above forty years, without suffering by intermitting fevers, though his family consisted of fifty or sixty persons. There were about one hundred acres of clear ground in front of his house that had been cultivated many years: but there was a thick wood behind the house. In the beginning of the year 1785 he caused all the timber and shrubs that were behind his house, within four or five hundred yards, to be cut down. His object was pasture and a free circulation of air. One third of his family, on the next summer, was taken down by intermitting fevers. Such complaints were not more prevalent than usual, during that summer, in other parts of the flat country. Those fevers were certainly caused by exposing to the sun a large surface of fresh land, covered with putrescent vegetables. Similar effects are very common in the West Indies, where they are fatal to such a degree, that soil, newly turned up, is supposed by the planters to contain some pestilential quality.* Putrid exhalations are the general cause of those bilious intermittents; but in tropical climates, where the sun is vertical, and the tendency to putrefaction great, and where the influence of heat on

* We wish to call the attention of cultivators to this important fact.—The danger from newly cleared ground is much increased, if the common summer and autumnal winds, the southwest, blow over them, in a direction towards the mansion house. A confirmation of the truth of this observation, occurred last summer at Colonel Joshua Howell's, in New Jersey, within eight miles of Philadelphia. A thick piece of wood to the southwest of the house, was cut down in the spring. This wood also served as a barrier between the house and a large extent of marsh, a quarter of a mile distant. About the middle of August, the whole family was attacked with severe remittent fevers, of which three died, and eight or ten more recovered, under the early use of blistering, and powerful exhibition of wine, Peruvian bark, and serpentaria.—*Ed. Elec. Rep.*

the living body increases the malignancy of the complaint, those fevers become most fatal. The simple intermitting fever that prevails during the summer season, in Carolina, is seldom fatal to the natives, except in cases where the frequent recurrence of such fevers may occasion an indurated spleen and other visceral obstructions. The consequence of such obstructions is a dropsy or other cachectical complaint, of which the patient dies. Fevers of the warm season sometimes become dangerous, especially to strangers, by the imprudent conduct of the patient. Upon the approach of febrile symptoms, strangers are apt, as they express themselves, to brave the fever. In this case, by taking exercise, increasing the muscular motion, and not unfrequently by the use of ardent spirits, or other stimulating drinks, they bring on a typhus or other constant fever, instead of a simple intermittent. A warm season, followed by a considerable drought, often produces an endemical flux or dysentery. Those complaints are doubtless of the putrid kind, and should be treated accordingly.

People on the low grounds of Carolina, are frequently attacked by fevers in the winter, which are called inflammatory; for they are attended by pain in some part of the head or the breast. These fevers, in many cases, prove fatal in three or four days. By the general symptoms, compared with the circumstances and places in which those fevers prevail, they seem to be of the putrid kind. They prevail in districts that are subject to intermitting fevers; whence they may be presumed to arise, in some measure, from the same cause; but they prevail in a different season of the year; whence it may be inferred, that there is a combination of causes in one fever that does not occur in the other. It has already been observed, that intermitting fevers are more or less frequent in the low lands of Carolina, according to the quantity of putrescent vegetable substance that is exposed to the action of the sun. From this circumstance it is conjectured, that the most simple species of intermitting fevers are, in some measure, the effect of putrefaction; but the most dangerous putrid fevers arise from the same cause. The difference then between the appearance or the effects of those fevers must depend on the state of the solids or the fluids of the person affected, or upon the acrimony

or virulence which the putrescent matter may have acquired before it is absorbed. The appearance of those fevers in the summer, when putrescent matter is plentifully diluted by rain, seems to be determined, in some measure, by the constitutions of the several patients. Strangers, from a northern climate, who have a vigorous constitution, whose muscular system is well braced, instead of having a moderate fever, in the summer or autumn, that will duly intermit after the first or second day, in many cases have an ardent fever, with full pulse. Instead of intermitting, it puts on the appearance of a typhus, or a nervous fever, in a few days, and terminates fatally. The same cause should produce the same effect upon similar bodies; but the effects upon the native and stranger are not alike; hence we infer, that a tense fibre or vigorous constitution, which naturally excites more heat, or causes the fever to be more ardent, produces, at the same time, a different and dangerous type. According to this theory, we observe, that by taking violent exercise, when the symptoms of an intermitting fever are coming on, the fever becomes ardent, and in many cases it is attended with danger. From these facts it would appear, that the affecting cause remaining the same, the fever is more or less dangerous according to the constitution of the patient, or any other circumstance that tends more or less to brace the system, or produce symptoms of inflammation.*

Though the fevers that appear in winter, are not usually called intermittents, they are not less effected by putrescent vegetable matter than the autumnal fevers. Those winter fevers have been deemed inflammatory, because they are usually attended by a pain in the head, or by a pain in the breast, that resembles pleurisy. They prevail not only in the same districts in which intermittents are common, but they are most likely to attack people who, on the preceding autumn, had suffered by

* A young man, near Pasquotank, heated himself by dancing, after he had been affected some hours by a slight pain in the brow. This happened in the winter season, during the prevalence of a complaint, that is called, however improperly, "a pleurisy in the head." He died within two days. This disease having obtained the name of an inflammatory fever, is usually treated like such complaints, by copious blood-letting. Though the patients, most of them, die, the lancet continues to be used with too much freedom; be-

intermitting fevers. These circumstances make it probable, but there are other circumstances from which it is certain, that the fevers to which I refer arise from a septic cause. In different years they prevail in different neighborhoods, affecting one or more persons in every family. When this disease is most prevalent, it may generally be traced to the vicinity of a marsh or the bed of a river, where mud or other putrescent vegetable substance has been exposed to the sun, in dry weather. The effects of dry weather on similar grounds, in the summer season, are frequently a flux or dysentery, which is also of the putrid kind. If the same cause, that would produce a simple intermittent, may also be found to produce an ardent fever, tending to putrefaction, by the sole concurrence of muscular motion, or the direct operation of the sun, whereby heat is excited, we are to presume that winter colds would produce remarkable effects on the appearance of that fever. The common effect of cold is to brace the solids and check the perspiration. In the case before us, the perspiration being obstructed, the offending matter, that has been absorbed, is retained in the system and gives a septic disposition to the fluids, by the increased action of the muscles.* It is generally observed that men suffer more than women or children by this disease. In

cause it seems to give temporary relief, and it can be used by men who have never taken the trouble to learn the nature of the disease, nor its proper remedy.

* It has been alleged, that the endemic fevers of summer and winter are equally caused by the absorption of putrid matter into the system. In support of this opinion we observe, that being exposed to a heavy shower in summer or autumn, in warm climates, is usually followed by intermitting fevers; but people at sea, in the same latitude and season of the year, expose themselves to showers without danger, because the atmosphere, at sea, is not charged with putrescent exhalations. It may also be observed, that people who use unguents, in warm climates, are less endangered by those fevers. Black people and white people, who have a copious perspiration, are also less subject to those complaints. Cold evenings in the autumn, and rain, by shutting the pores of the skin, are known to be the cause of innumerable fevers. While the perspiration is free, the putrid matter, that may be taken in by the absorbing vessels, is immediately discharged from the system; but in the case of obstructed perspiration, it is retained among the circulating fluids and becomes the seed of mortal disease. In cold weather, the complaint is usually thrown upon the head or breast.

the months of December and January 1794, 5, eight or nine men, the heads of families, who lived near the river Neus, were taken off by a fever such as I have mentioned; but no other people in that vicinity suffered by the disease. Some cause must have existed for this remarkable difference. The complaints of those men were not produced by intemperance alone; for though ardent spirits injure the system not only by destroying the powers of the solids, but also by vitiating the fluids, whence they bring on death in various forms, some of the men who fell under that bilious pleurisy, were not intemperate. In this case the disease seems to have arisen from obstructed perspiration. It cannot escape notice that men in Carolina are chiefly exposed to complaints which arise from that source. The temperature of the weather, in the eastern part of the state, is very changeable. When the wind is at northwest, there is occasional hard frost; but the weather, at other times is moderate and soft. As there are not many cold days, nor many days in which flannels or thick woollen garments are necessary, people fit their dress for the temperate weather, and not for the few days of incidental cold. They do not consider that warm clothes may be worn in temperate weather without danger; but thin clothes, in cold weather, expose the wearer to mortal disease. Women and children are not only more temperate than men, but they are usually at home; and they can increase their clothes upon a sudden approach of cold, or they can sit by the fire. Men are frequently surprised by rain or sudden cold, when they are abroad, and are not provided with a suitable dress. Prudence is the child of experience, but heedless men are seldom taught by the experience of other people. Personal experience in this as in many other cases, frequently comes too late. When the planters, they especially who have been visited by intermitting fevers during the summer or autumn, and those who live in the flat country, shall have the prudence to keep themselves dry, and shall be provided, in all their excursions, during the winter, with clothing fitted to cold weather;* when

* Such is the commendable industry of women in Carolina, that two thirds of the inhabitants are clothed in cotton that is raised, spun, and woven by themselves. This is an excellent dress for warm or temperate weather; but a garment of soft wool to be worn next the skin, is greatly to be preferred.

they shall exchange the use of grog and ardent spirits for beer well seasoned with hops, or water that is less dangerous than either, we may be assured that many useful lives will be saved to the community.

When the country shall be sufficiently cleared, and the lands perfectly drained, there is much reason to believe, that people near the seacoast will enjoy a desirable state of health through the latter part of the summer, which is now called the sickly season.† The weather will also be less variable during the winter season, for reasons that have been stated; and a free circulation of air will diminish the summer's heat.

There are not many countries, in which the state of health differs so much as it does at present in the different parts of North Carolina. At the distance of sixty or seventy miles from the coast the land begins to rise into small hills, stones appear on the surface, and the streams ripple in their course. As we advance a little further to the westward, we find all the variety of hills and dales that may consist with a fertile country, fit for cultivation. In that happy climate where the soil is good, and the water pure; where the inhabitants enjoy the desirable effects of winter, without suffering by the rigorous severity of cold; there are few of the diseases which are most painful and destructive in cold climates: neither are the inhabitants wasted by the more fatal diseases of warm climates. There are not many parts in the United States, perhaps there is not any part of the world, in which families increase faster than in the western part of Carolina. When we consider, that the inhabitants are seldom affected by coughs, consumptions, or inflammatory complaints, for the winters are temperate; that intermitting, bilious, or putrid fevers are seldom found among them; we naturally infer, that the climate must be healthy. It is not denied, that people, in many other climates or countries, are equally healthy with those in the western part of Carolina; but the winters in

by valetudinarians. It is found that sheep thrive very well in Carolina, and their wool is good in quality. Planters, such of them especially as are invalids, and they who live in sickly districts, should never go abroad in the winter season, without a flannel waistcoat under the shirt, and a substantial greatcoat to be worn in case of a sudden change of weather.

† Instances of longevity are not wanting in Carolina in the flat country.

other regions, that are deemed healthy, are more severe, or the land is less fertile, or it is not so cheap, or the means of supporting a family, from one cause and another, are more difficult than in Carolina; whence it follows, that early marriages are not so frequent, and the increase of families is not so great. We have not the means of comparing the increase of people in Carolina with that in foreign countries, but it has been compared with the increase in other states. It appears by the census taken in the year 1791, that the number of inhabitants above sixteen years old, exceeded the number under sixteen in all the northern and middle states, including Maryland. In the southern states there was a difference in favour of those under sixteen, and this difference was greater in North Carolina than in any other state, except Kentucky. This difference might be explained by supposing that the duration of human life is shorter in the southern states, and that sixteen years is nearer the middle of the general extent; but this solution cannot be admitted, because in the most healthy parts of the southern states the difference was greatest in favour of the class under sixteen. The greater proportion of people below sixteen must be the combined effect of early marriage and a good climate. Families are easily supported where the lands are good, and the winters mild. In this case people marry young, and have many children: but early marriage alone will not produce a great proportion of children when compared to that of grown persons, because sickly climates are not less fatal to infants than to those who are more advanced in years. This distinction is fully supported by the census in North Carolina. The number of males in the whole state, below sixteen, was to that above sixteen, nearly as eleven to ten; but this difference cannot be the effect of early marriage alone, or the facility of maintaining a family; it depends very much on the salubrity of the climate. People live in the district of Edenton with more ease than in the district of Salisbury; for their cattle require less feeding in winter,* and they have a plentiful supply of fish; but the

* The flat lands near the coast, except such of them as are composed of sand, are generally covered by a thick growth of canes. The leaves of this plant are green all winter. They are long and succulent, and cattle in general are greatly attached to them.

proportion of persons under sixteen, was to that above sixteen, in Salisbury district, compared to that in Edenton district, nearly as three to one. In Salisbury district there were fifteen thousand eight hundred and twenty-six males under sixteen, and thirteen thousand nine hundred and eight above sixteen. The difference is nearly equal to a seventh part of the whole number of the older class. In Edenton district, the number of males under sixteen, was eight thousand six hundred and ninety-six, and the number above sixteen, was eight thousand three hundred and ninety-four: the difference being less than a twenty-seventh part of the number of the older class. This remarkable excess, in favour of Salisbury district, can only be explained by the greater salubrity of the climate. There are some very old people in the western parts of Carolina, but they were not born in that country; they are older than the settlement. After the country shall have been planted two or three centuries, and the natives shall have attained the length of years that corresponds with the climate, a greater proportion of the inhabitants above sixteen years will doubtless be found."

Practical Remarks on the Trembling occasioned by Mercurial Vapours. By M. BURDIN, Jun. M. D. From the Journal General de Médecine, 1811.

[From the New Medical and Physical Journal for November, 1811.]

Among the numerous affections to which the muscular system is liable, and which show themselves in such various ways from the tetanus to complete paralysis, are the St. Vitus's dance, and the tremblings which affect the workmen employed in lead or quicksilver mines, barometer-makers, gilders, and looking-glass makers who silver the mirrors. I shall speak only of the last affection, which I have often had occasion to observe; the symptoms of which, I believe, are not generally known, although they are very interesting, and resemble very nearly those described by Rammazini when treating of the diseases of gilders. The effects produced by mercury, depend upon the state of the metal, its quantity, and the time any one is exposed to its action. This action may either be very speedy,

or may be some time in showing itself, as the following cases prove.

A person who was filling a large spiral thermometer, happened to break it over a chaffing dish which contained a great deal of fire; the mercury, which was already very warm, immediately began to evaporate, so that the workman received in an instant, a great quantity of the vapours into his mouth and nostrils. Twelve hours afterwards, a complete salivation came on, and the patient was feverish. All the symptoms produced by the mercury applied in hot vapour to the part upon which it acts with a sort of predilection, had disappeared in about ten days.

The looking-glass silverers are affected with symptoms which observe a different course; the mercury they make use of, does not produce salivation, but gives rise to tremblings, which do not begin to show themselves until after some months of constant labour. The metal which affects the silverers is in the form of grey powder, very volatile, and which they call *avivure*.

The *avivure*, treated by nitric acid, gives three fourths of mercury and one fourth of tin, slightly oxydized; the same results were obtained by distillation. The *regrature* for mirrors, submitted to the same analyses, gives, on the contrary, three fourths of tin and one fourth of mercury; this forms also a grey powder, but not so fine, consequently less volatile, and less dangerous.

Physicians seldom have occasion to see the trembling peculiar to these workmen, because they do not apply to any practitioner to cure them; they employ a method nearly as ancient as the disease itself, which consists in the use of baths and strong sudorifics, either alone or combined with mild purgatives. Formerly, the workmen employed in the manufacture of mirrors at Paris, were accustomed to silver them during one week, and be busied about other work for the following six weeks: for some years past, they have usually silvered them one day in every week, which is the more healthy practice for them; but those persons who are constantly employed in this manner, are not long before they experience very severe tremblings. First, they feel slight pains in the joints, particularly

in the wrists, the elbows, the knees, and the feet; then comes on a universal excitement, the head is affected, and very soon the trembling, which begins in the hands, becomes universal, if the cause which occasioned it is not withdrawn; they then speak with difficulty. I have seen a patient, in whom the convulsive shaking was so violent, that he could not handle any thing without hazard of breaking it; his legs were contracted in an extraordinary manner, so that when he descended a staircase, he was sometimes obliged to jump two or three steps; to avoid this, he accustomed himself to go down backwards on his hands. He was obliged to drink out of a dish, that he might carry the fluid more readily to his mouth, and to prevent breaking the glass between his teeth, from the convulsive affection of his jaws. When a person is in this state he is very irascible, and a fit of anger so increases the shaking, that if he were not sitting, he would infallibly fall down.

When imperious necessity compels the workmen to continue respiring this metallic atmosphere, their countenance becomes pale, and takes on an expression of intoxication, their intellects gradually fail, and they come at last to a sort of idiotism, which is not got the better of after it has continued some years; they languish in this state a longer or shorter time, and generally die of consumption; sometimes they fall a victim either to asthma or obstruction in some of the abdominal viscera, or they are carried off by apoplexy.

Workmen employed in this business, can seldom continue at it longer than eight, twelve, or eighteen years, without experiencing several attacks, to which they infallibly fall victims if they pursue their employment, even with the ordinary precautions.

I knew a workman who had followed this business twenty-five years; it is true, that within that time he had remained four years without doing any work; he had had many attacks, and they had left a trembling upon him which obliged him to change his business. This workman told me, that he had never known, in the faubourg Saint-Antoine where he dwelt, any one who could continue at the work eighteen years; that he believes he could not have stood it so long, but that he was accustomed not to open his mouth in the workshop, for he had

no doubt, that the accidents that happened, were owing to the avivure which they respired during their work.

I am persuaded, that with the following precautions, one cause of these severe diseases might be removed from these unfortunate people: They ought to have a large open workshop, set apart entirely for silvering the mirrors, and to be there at no other time; while they are at work, they should apply over their mouth and nose a muslin handkerchief, which would suffer the air to pass through, and intercept the metallic particles. The tables should be placed before a chimney, in which there should be a clear fire, and behind the workmen should be an open door or window, so that the avivure may be drawn towards the fire; the workmen should also accustom themselves to take a bath from time to time, to live well, to clothe themselves well, and to avoid excess of every kind. The treatment adopted by these workmen is frequently serviceable. We can easily conceive, that the use of sudorifics, aided by mild purgatives and bathing (especially leaving off respiring the noxious vapour), cannot but be salutary. I have had occasion to observe many times, that a strong dose of opium, or a state of half intoxication, diminished the tremblings, and gave a sort of steadiness to the patient. In the case of intoxication, it is curious to see him who was trembling, regain steadiness in proportion as he drinks: while he who was steady at first, is quite tottering by the time he leaves off drinking.

On a Case of Nervous Affection cured by Pressure of the Carotids; with some Physiological Remarks. By C. H. PARRY, M. D. F. R. S.

[From the Philosophical Magazine, for August 1811]

OBSERVING that the Royal Society, of which I have the honour to be a member, occasionally receives communications illustrative of the laws of animal life, which are indeed the most important branch of physics, I take the liberty of calling their attention to a case, confirming a principle which I long ago published, and which, I believe, had never till then been remarked by pathologists.

About the year 1786, I began to attend a young lady, who laboured under repeated and violent attacks, either of headach, vertigo, mania, dyspnœa, convulsions, or other symptoms usually denominated nervous. This case I described at large to the Medical Society of London, who published it in their *Memoirs*, in the year 1788. Long meditation on the circumstances of the case led me to conclude, that all the symptoms arose from a violent impulse of blood into the vessels of the brain; whence I inferred, that as the chief canals conveying this blood were the carotid arteries, it might perhaps be possible to intercept a considerable part of it so impelled, and thus remove those symptoms which were the supposed effect of that inordinate influx. With this view, I compressed with my thumb one or both carotids, and uniformly found all the symptoms removed by that process. Those circumstances of rapidity or intensity of thought, which constituted delirium, immediately ceased, and gave place to other trains of a healthy kind; headach and vertigo were removed, and a stop was put to convulsions, which the united strength of three or four attendants had before been insufficient to counteract.

That this extraordinary effect was not that of mere pressure, operating as a sort of counteracting stimulus, was evident; for the salutary effect was exactly proportioned to the actual pressure of the carotid itself, and did not take place at all, if, in consequence of a wrong direction either to the right or left, the carotid escaped the effects of the operation.

This view of the order of phenomena was, in reality, very conformable to the known laws of the animal economy. It is admitted, that a certain momentum of the circulating blood in the brain is necessary to the due performance of the functions of that organ. Reduce the momentum, and you not only impair those functions, but, if the reduction go to a certain degree, you bring on syncope, in which they are for a time suspended. On the other hand, in nervous affections, the sensibility and other functions of the brain are unduly increased; and what can be more natural than to attribute this effect to the contrary cause, or excessive momentum in the vessels of the brain? If, however, this analogical reasoning has any force in ascertaining the principle, I must acknowledge that it did not occur to me till

twenty years afterwards, when a great number of direct experiments had appeared to me clearly to demonstrate the fact.

From various cases of this kind, I beg leave to select one which occurred to me in the month of January 1805.

Mrs. T. aged 51, two years and a half beyond a certain critical period of female life, a widow, mother of two children, thin, and of a middle size, had been habitually free from gout, rheumatism, hæmorrhoids, eruptions, and all other disorders, except those usually called nervous, and occasional colds, one of which, about two years and a half before, had been accompanied with considerable cough, and had still left some shortness of breathing, affecting her only when she used strong muscular exertion, as in walking up stairs or up hill.

In February 1803, after sitting for a considerable time in a room without a fire, in very severe weather, she was so much chilled as to feel, according to her own expression, "as if her blood within was cold." In order to warm herself, she walked briskly for a considerable time about the house, but ineffectually. The coldness continued for several hours, during which she was seized with a numbness or sleepiness of her left side, together with a momentary deafness, but no privation or hebetude of the other senses, or pain or giddiness of the head. After the deafness had subsided, she became preternaturally sensible to sound in the ear of the affected side, and felt a sort of rushing or tingling in the fingers of the left hand, which led her to conclude that "the blood went too forcibly there."

Though the coldness went off, what she called numbness still continued, but without the least diminution of the power of motion in the side affected. In about six weeks, the numbness extended itself to the right side.

Among various ineffectual remedies for these complaints, blisters were applied to the back, and the inside of the left arm above the elbow. The former drew well. The latter inflamed without discharging; so that a poultice of bread and milk was put on the blistered part. After this period, the muscles of the humerus began to feel as if contracted and stiff; and these sensations gradually spread themselves to the neck and head, and all across the body, so as to make it uncomfortable for her to lie on either side, though there was no inability of motion.

She now began to be affected with violent occasional flushings of her face and head, which occurred even while her feet and legs were cold, together with a rushing noise in the back of the head, especially in hot weather, or from any of those causes which usually produce the feelings of heat.

It is difficult to give intelligible names to sensations of a new and uncommon kind. That which this lady denominated numbness diminished neither the motion nor the sensibility of the parts affected. It was more a perception of tightness and constriction, in which the susceptibility of feeling in the parts was in fact increased; and the skin of the extremities was so tender, that the cold air produced a sense of uneasiness, the finest flannel or worsted felt disagreeably coarse, and the attempt to stick a pin with her fingers caused intolerable pain.

In the month of September 1803, not long after the application of the blisters, she experienced, in certain parts of the left arm and thigh, that sensation of twitching which is vulgarly called the "life blood," and which soon extended itself to the right side. Shortly afterwards, she began to perceive an actual vibration or starting up of certain portions of the flexor muscles of the fore-arm, and of the deltoid on the left side; not so, however, as to move the arm or hand.

This disorder had continued with little variation to the period of my first visit. The vibrations constantly existed while the arm was in the common posture, the fore-arm and hand leaning on the lap. If the arm were stretched strongly downwards, the vibration of the flexors ceased, but those of the deltoid continued. The arm being strongly extended forwards, all ceased; but returned as soon as the muscles were relaxed. The vibrations were of different degrees of frequency, and at pretty regular intervals, usually about 80 in a minute. They were increased in frequency and force by any thing which agitated or heated the patient, and were always worse after dinner than after breakfast. The pulse in the radial artery was 80 in a minute, and rather hard. That in the carotids was very full and strong; and each carotid appeared to be unusually dilated for about half an inch in length, the adjacent portions above and below being much smaller, and of the natural size. I much regret that I find in my notes of this case, no inquiry whether there

was any coincidence between the systoles of the heart and the muscular vibrations. The patient's feet were usually cold, and her head and face hot. The feeling in her limbs was much as I have above described, except that the sensibility was somewhat less acute than it had been, and she complained of a tightness all over her head, as if it had been bound with a close night-cap. Her sleep was usually sound on first going to bed, but afterwards, for the most part, interrupted by dreaming. Bowels generally costive: appetite moderate: no flatulency or indigestion: tongue slightly furred, without thirst: urine variable, but generally pale.

The late Mr. George Crook, surgeon, was present while I made these examinations; and when we afterwards conversed together, I remarked to him, that if my theory of the usual cause of spasmodic or nervous affections were well founded, I should probably be able to suppress or restrain these muscular vibrations of the left arm, by compressing the carotid artery on the opposite or right side; while little effect might perhaps be produced by compressing the carotid of the side affected. The event was exactly conformable to my expectation. Strong pressure on the right carotid uniformly stopped all the vibrations, while that on the left had no apparent influence. I may add that these experiments were afterwards, at my request, repeated on this lady in London by Dr. Baillie, and, as he informed me in a letter, with a similar result.

It is perfectly well known to many of the learned members of this society, that irritations of the brain, when of moderate force, usually exhibit their effects on the nerves or muscles of the opposite side of the body; and in the case before us, it is difficult to understand how the suspension of these automatic motions could have been produced by this pressure of the opposite carotid, in any other way than by the interruption of the excessive flow of blood through a vessel morbidly dilated; in consequence of which interruption, the undue irritation of the brain was removed, and the muscular fibres permitted to resume their usual state of rest.

From these and many other similar facts, I am disposed to conclude, that irritation of the brain, from undue impulse of blood, is the common though not the only cause of spasmodic

and nervous affections; and I can with the most precise regard to truth add, that a mode of practice conformable to this principle has enabled me, during more than twenty years, to cure a vast number of such maladies which had resisted the usual means.

An investigation of all the modifications of the principle itself, and of its numerous relations to therapeutics, would be inconsistent with the views of the Royal Society, and must be reserved for another place.

Bath, Dec. 8, 1810.

Facts and Observations on Quickening.

[From the Medical and Physical Journal, for June 1812.]

Præterea, si immortalis natura animæ

Constat, et in corpus nascentibus insinuat. — *Lucretius*, lib. 3.

OPINIONS and investigations which respect the nature and mode of existence of that immortal principle called the *Soul*, prior to its taking possession of its corporeal tenement, have never established any other fact so firmly, as that the human intellect possesses the property of perplexing a subject, to a most extravagant degree, by the aid of learning and philosophy. The notion of the pre-existence of the human soul, consisting, according to Pythagoras and Plato, of a divine idea united to a portion of the *animæ mundi*, has spread far and wide. In Greece the principle of the metempsychosis took full possession of the most refined and refining philosophers; and the reminiscence* of Plato resounded in the groves of the academy, awakening the imagination to the recognition of events which had passed in former modes of existence, when the soul, travelling

* Intellection is the operation of the understanding contemplating intelligible forms, or ideas. It is twofold: the first, that of the soul contemplating ideas before it descends into the body; the other, that which it exercises after it is immersed in the body. The first kind of knowledge consists in the recollection of those things which the mind had known in its pre-existent state, and differs from memory in the object; memory being employed upon sensible things, reminiscence upon things purely intelligible. — *Vide Brucker's Historia Critica Philosophiæ.*

from being to being, now incited a hero at the Trojan war, now flushed the cheek of some fair Helen, flew in birds, swam in fishes, or crawled, in penal degradation, in some horrid reptile. Absurd, or devoid, at least, of sober certainty, as the metempsychosis must be, we find that both the savage and the sage, at one period of the world, admitted its validity. Among the celtic* nations, in the religions of Hindu, and the oriental tribes both of the continent and islands of the Indian Ocean, we meet with this opinion.†

Little suited as these observations may at first seem to a Medical Journal, they are not totally irrelevant, because this notion of the separate existence of the soul, and its capability or property of being infused into bodies at particular periods,

* A passage in Lucan ascribes the doctrine of transmigration to the Northern nations.

Vobis auctoribus, umbræ
Non tacitas Erebi sedes, Ditisque profundi
Pallida regna petunt: regit idem spiritus artus
Orbe alio: longæ, canitis si cognita, vitæ
Mors media est. Phars. lib. 1. v. 454.

† In the institutes of *Menu*, there is a scale of the penalties to which the immortal soul is doomed. "For sinful acts, that are mostly corporeal, a man shall assume, after death, a vegetable or mineral form: for such acts, mostly verbal, the form of a bird or beast: for sinful acts, mostly mental, the lowest of human conditions." The Jewish *Cabbala* holds that all souls were produced at once, and pre-existed in Adam; and that every human soul has two guardian angels, produced by emanation, at the time of the production of souls. The cabbalistic doctrine is minute and elaborate in its investigation of the human soul, which it describes as consisting of four parts: *Nephesh*, or the principle of vitality; *Ruach*, or the principle of motion; *Neschamah*, or the power of intelligence; and *Jechidah*, or the divine principle. The old doctrine of *Quickening* might have raised an implacable war between *Nephesh* and *Ruach*. Not very remote from the doctrine of the *Cabbala* was that opinion of Plato which makes the soul consist of three parts: the first, the seat of intelligence; the second, of passion; the third, of appetite. The Egyptians, according to Herodotus and Diogenes Laertius, believe, that, when the body decays, the soul passes into some other animal, which is then born; and that, after it has made the circuit of beasts, birds, and fishes, through a period of 3000 years, it again becomes an inhabitant of a human body. To collect and detail the opinions of Aristotle, Socrates, Pythagoras, Empedocles, Democritus, Heraclitus, Epicurus, Strabo, Diocarchus, &c. &c. on this abstruse subject, would hardly reward the labour.

"Much of the soul they talk, but all awry."—*Milt. P. R.* iv. 313.

countenanced an hypothesis that professed to explain a natural fact occurring, under very interesting circumstances, to the human female. If it were admitted that the principle of animation, or the soul, was added to the embryo at any distinct period of gestation, posterior to its first formation, it might account for the peculiar sensation which is experienced by women about the sixteenth week of pregnancy; and which sudden infusion not only the vague and visionary theorist believed, but the sober judge on the bench, and the grave doctor in the professional chair, taught or enforced. When the professor mixed up his physiology with the abstract metaphysical notion of the pre-existent state of the soul, and its application to the corporeal fabric at some particular period of utero-gestation, his mistake was no further important, perhaps, than as it led his pupils aside from the plain path of truth, into the tangled wilderness of error, and suppressed the still small voice of Nature with the obstreperous jargon of the schools; but, when the judge pronounced on the innocence or criminality of actions on this hypothesis, truth was not only violated, but society sustained an injury.

As the opinion above alluded to has been, if it is not even now, very generally held, it may not be quite improper, to state what is, probably, the true nature of the sensation called QUICKENING.

I need not cite evidence to prove that the ancient philosophers and physicians, and the earliest of the modern professors of the obstetric art, believed, that the peculiar sensation of Quickening, as it is erroneously called, occurred when the fœtus received the principle of vitality, or became animated; and that the specific feeling in the mother was produced by its first motions. Courts of justice recognized this hypothesis also, as a principle by which the degree of criminality in cases of *abortus procuratus* were to be determined. If these were the opinions of times long past away with their errors and their delusions, how stands the question now? This will be answered by allowing the grave and learned leaders of the *ars obstetrica* to tell their own tale.

Dr. Denman (Introduction to the Practice of Midwifery, 5th edit. 1805,) says, " By the term *Quickening* is understood

the first sensation which the mother has of the motion of the child which she has conceived. This happens at different periods of pregnancy, from the tenth to the twenty-fifth week, but most commonly about the sixteenth after conception; yet the motion of the child is in *some women so obscure*, or such little attention is paid to it, that it is not perceived or regarded, and in others so indistinct as to be confounded with various other sensations. It is not unusual for women to have a few drops of blood discharged from the vagina at the time of *quickening*; but the symptoms which attend are generally such as are occasioned by surprise or agitation from any other cause, as fainting, or some hysteric affection." Of the changes which succeed immediately upon the sensation of quickening he speaks with more precision;* and, if such a fact did not frequently occur, it would be surprising that, when so near the truth, he had not distinctly seen what the cause of the sensation of *quickening* really was. But it is left as much in the dark, as it was at any former period. The changes consequent on quickening are not quickening itself; they are the effect of this alteration in the female economy, whatever it may be.

Professor Hamilton (*Outlines*, 5th edit. 1806) has almost stepped upon the true nature of this peculiar sensation. "Faintings," he says, "seldom occur," (that is, during pregnancy,)

* These changes have no connexion whatever with the first motions of the child, but are altogether produced by the alteration of position in the uterus. "The changes which follow quickening, (the doctor says,) have been attributed to various causes: by some it has been conjectured that the child then acquired a new mode of existence; or that it was arrived at a size to be able to dispense with the menstruous blood, &c. Others have believed, that the changes ought to be assigned merely to the enlargement of the uterus, increased by *the growth of the ovum* to such a size, that it was supported above the brim of the pelvis; by which means all the inconveniences which arose from the dragging or subsistence of the uterus in the vagina were removed: and this seems to be the true reason." But these changes, as before observed, have no manner of connexion with quickening, as referred to the first motions of the fœtus; and the confounding under this term the first motions of the child, with the specific sensation occasioned by the sudden change of the womb's position, and then explaining the alterations in the woman's health, by referring them to quickening, or the first perceived motions of the child, are so illogical, as hardly to have a trace of the true fact. Neither the specific sensation, nor the ceasing of the irritability of early pregnancy, depend, in any degree, on the first motions of the fœtus.

“except about the time of *quickening*. They seem to arise from the sudden change of position of the uterus, emerging from its close confinement within the bony parietes of the pelvis, and from the irritation *communicated by the child's motion*.” He does not however intend here to explain what *quickening* itself is, but looks to one of its phenomena, deliquium; and he hangs upon the old opinion of the child's motion, as an efficient cause of the mother's sensation. So little did he, probably, understand of the real nature of this incident in 1806, that he must be considered as having left it in absolute darkness; though he approached to the truth, the veil was not removed. In the year 1811, his countryman, John Burns, who, when writing on the “Principles of Midwifery,” could not but have seen the professor's “Outlines,” had no glimpse of the true nature of *quickening*. “In some cases, very little disturbance is produced,” (that is, by the impregnated state,) he says, “and the woman is not certain of her condition until the child quickens, which happens about the fourth or fifth month of pregnancy, in a few instances at the end of the third. This quickening is attended with a sensation of motion, or fluttering in the lower belly, and is not unfrequently accompanied with faintishness or hysterical irritation.” And again; “when the women have any doubt with regard to their situation, they generally look forward to the end of the fourth month as a period which can ascertain their condition; for at this time, or a little sooner or later in different women, *the motion of the child is first experienced, or it is said to QUICKEN*.”

The London Practice of Midwifery, Edit. 1811, rumoured to be a transcript of Dr. Clarke's Lectures, says but little on the subject; and, even in what it does say, blunders egregiously. “The diseases of irritation cease just *before* the time of quickening,” is the assertion of this London Practice. Just *after* the time of quickening is the fact: and why this happens can be explained. I must do Dr. Clarke himself the justice, however, to state that this is not his opinion. The complaints of early pregnancy, he says (Essays, &c. 2d edit. 1806), will be relieved by quickening;* But he no where indicates, as far as I

* Does the doctor mean to refer here to the motion of the child, or to the change of position in the uterus, under the term quickening. If he refers

know, what the nature of this quickening is. The latest and most respectable Medical Dictionary we have, published in 1809, and which may fairly be admitted to have collected opinions to the period of its publication, when endeavouring to lay down data for regulating the reckoning in pregnancy, says "the whole should be corrected by the *quickening, the period when the child's motion is perceived.*"*

From this evidence, it may unquestionably be inferred, that the latest and most esteemed writers on midwifery still hold the opinion that *Quickening* is a peculiar circumstance of the fœtus; and that this circumstance is no other than its first motions consequent on its new mode of existence; which, being felt by the mother, produce the extraordinary and alarming sensation described under the above denomination.

I must reject, however, the received opinion, that the specific sensation experienced by the mother, under the term *Quickening*, is to be ascribed to the first perceptible motion of the fœtus, when that fœtus is vaguely said to become animated; because,

by this term to the first motions of the child, he is wrong as to the complaints of early pregnancy then ceasing: if he refers by this term to change of position in the uterus, he is wrong in the application of the term, though right in asserting that the complaints of early pregnancy then cease. The change of the position of the uterus is the efficient cause of the cessation of these complaints.

* A most respectable Medical Review, having occasion to notice *quickening*, in April 1810, says, "the only physiological question which occurred during the course of this trial (the trial of Pizzy and Codd, in 1808, for procuring Abortion), and perhaps the only one which properly comes under our consideration, was in regard to the time in which a child quickens. A medical witness, examined, deposed that it took place in about eighteen weeks, sometimes at fourteen, and sometimes not till twenty weeks, but mostly about eighteen; and he never knew it so late as twenty-five weeks, though he could not say that it sometimes may not happen until the 21st or 22d. Upon the subject of quickening, we may observe," the reviewer proceeds, "that, although recognized by popular belief, and even by the laws of the land, as something definite, it is not so. The growth and development of the child is gradual and uniformly progressive. During no period of gestation does any sudden revolution or change take place; and what is called quickening is merely the motions of the child becoming sensible to the mother." —*Edinburgh Med. and Surg. Jour.* April 1810. 248.

1st, The sensation of quickening* is not constant and universal: some women never experience it, others with some of their children only.

2d, It has a distinct character from any subsequent motion of the child: no woman ever admits that it resembles, in the slightest degree, the struggles of the fœtus.

3d, This sensation is never repeated in the same pregnancy, which must happen if it arose from the motion of the child.

4th, It is totally incomprehensible that any motion of which the fœtus is capable, in the fourth month, should communicate such a sensation to the mother as to produce *delirium animi*.

Considering then that the sensation called *Quickening* is an accidental circumstance, and not depending on any conjectural sudden imparting of life to the embryo, which, if a fact, must be a permanent occurrence; that there is no parity between the effect and the assumed cause; and that this effect, if it arose from any motion of the child, must produce similar sensations in the mother during the subsequent period of gestation, when its struggles are still more palpable; I am compelled to observe, that this opinion is only proper for the dark ages of scholastic confusion, and unsuited to that philosophy which now directs our researches into the laws and operations of Nature.

On the ground above stated, presuming that the opinion which refers the sensation denominated, with gross want of precision, *quickening*, to some sudden imparting of life to the fœtus, or to its trifling and obscure motions when first perceived by the mother, to be altogether untenable; I believe the phenomena, observed without prejudice, will bear me out in the assertion, that it does not arise from the fœtus but from the uterus, and belongs not to the child but to the mother.

It is a known fact that the uterus, in the early period of pregnancy, descends into the pelvis, and there remains, usually,

* I do not speak of those at first obscure, but gradually increasing, motions of the child, felt by every pregnant woman, and with numerous repetitions during gestation; but of that singular and specific sensation felt but once in the same pregnancy, always disordering the woman for a time, often occasioning her to faint, and which has been pointed out as marking the period when the embryo receives the principle of animation under the term *quickening*.

to the latter part of the fourth month; and that, as it enlarges, it necessarily rises above the pelvis into the abdomen. There are three circumstances or facts connected with this change of local position of the uterus.

1st, The ascent of the impregnated uterus from its position in the pelvis to its subsequent station in the abdominal cavity, is sometimes gradual and unobserved: then the sensation called *quickening* is not felt.

2d, The uterus is sometimes so impacted in the pelvic cavity, as not to reach its final station within the abdomen, without the assistance of art: then occurs retroverted uterus, during which *quickening* is never felt.

3d, At other times, and those frequent though not constant, there exists some slight impediment to the ascent of the uterus; *which being suddenly overcome, it (the uterus) rises at once into the abdominal cavity, constituting what has so long been referred to the fœtus, under the term quickening.*

The sudden intrusion of the volume of the uterus among the abdominal viscera, parts of high sensibility, accompanied with as sudden a removal of pressure from the iliac vessels, is equal to produce the sensation called *quickening*.

No woman *quickens* (I am compelled yet to use this strange term, improper when referred to the fœtus, and absurd,* certainly, when applied to the mother,) while the uterus remains in the pelvis, nor when it has risen above the brim of that bony cavity and is settled in its place in the abdomen; *but the sensation is felt in transitu, at the moment when the uterus, removing from the pelvis, enters the abdominal cavity.*

* Our best philologists have used the word *quicken* in the absurd sense as applied to the mother. The verb active to quicken is of Saxon etymology, and literally means to *make alive*. The verb neuter to quicken, Johnson explains, *to become alive; as a woman quickens with child*: and he cites passages which prove it can apply only to the embryo.

They rub out of it a red dust, that converteth after awhile into worms, which they kill with wine, when they begin to *quicken*. *Sandys.*

These hairs which thou dost ravish from my chin,
Will *quicken* and accuse thee.

Shakspeare.

This postulate* admits of verification or rejection by experiment and observation. If those who are extensively employed in the practice of midwifery, will watch the sensation of *Quickening*, simultaneous with the change of locality in the uterus, they will find how near it is to a demonstration.

I am not aware that the specific sensation known so long by the term *quickening*, occurring to *some* pregnant women, has been thus explained before:† but I think this explanation removes all difficulty as to the natural fact, as well as it does also the metaphysical jargon about the sudden infusion of the vital principle into the *embryo*.

London, March 30, 1812.

MEDICUS.

An Account of a Case of Lithotomy; with Practical Remarks.

By JAMES BARLOW, Surgeon, Blackburn, Lancashire.

[From the Edinburgh Medical and Surgical Journal, for July 1812.]

IN an art of such extended importance as surgery, which involves so many of the natural evils to which mankind are unavoidably exposed, and where disease is so frequently diversified and modes of treatment varied, the recording of such events, whether as terminating favourably or fatally, is a method of conveying information, which is justly sanctioned by the most celebrated professors of the art.

Hence I have been induced to lay an account of the follow-

* The term *postulate* does not apply to the state of my own mind; but I concede that my position is assumed, until the fact has been examined, and the investigation pursued by others.

† That this opinion is not at this moment new to myself, however, I can prove, by a note in the Med. and Phys. Jour. for July 1810, p. 38, where, having occasion to notice *quickening* in consequence of the trial of Pizzy and Codd for procuring abortion, I observed, “quickening, as it is popularly termed, is a sensation of a peculiar quality, occurring to most women at some period of utero-gestation, and is believed to be the first indication of life in the fœtus. Perhaps this sensation has no dependence on the life of the fœtus, but is simply produced by the *impregnated uterus rising suddenly out of the pelvis into the cavity of the abdomen*.” More reflection and additional observation, make me now speak positively to this fact, which, in 1810, I gave to the public with some hesitation.

ing case of lithotomy before the public, more particularly as its history is distinguished by some peculiarity of circumstances; and in doing this, I have also availed myself of the opportunity of interspersing a few practical remarks connected with the subject, which have suggested themselves to my mind during the progress of the patient's cure.

About five years ago, I was consulted by Richard Holden of this neighbourhood, a stout, corpulent, robust man, then about sixty years of age, on account of great pain when passing his urine, accompanied with very frequent provocations to propel it. He informed me, that for some years past he had occasionally discharged both blood and mucus from the urethra, and that any violent bodily exercise was usually the forerunner of the former indication of calculous affection. These, together with other ordinary symptoms, led me to suspect a stone in the bladder, and I proposed passing a sound into that viscus, in order to adjust the opinion I had preconceived on the nature of the case; this proposal was, however, rejected, from an idea entertained by the patient of the pain which the introduction of an instrument into the bladder must unavoidably occasion.* In this state of incertitude my patient absented himself from me, and continued with frequent intermissions of pain till the sixth of November 1811, a lapse of five years, when I was requested to visit him. On my arrival, I was informed that he had not been able to evacuate his urine for nearly two preceding days and nights. On laying my hand on the abdomen, the patient complained of a considerable degree of pain in the region of the bladder, which was connected with tension, and the scrotum and ambient parts were of a dark livid colour. The catheter was immediately introduced, and my former opinion fully confirmed by the instrument striking against a stone, as was also notified by the sound emitted to the ear very distinctly. Nearly two quarts of dark-coloured

* It may be observed, that although the neck of the bladder be the part chiefly affected in a fit of the stone, nevertheless, it not unfrequently happens, that upon the sound being passed into the bladder, the stone is forced from its situation, and the patient experiences relief for a considerable interval, and till the stone, from some cause, becomes pushed into its former situation.

urine were drawn off, which afforded temporary relief; the warm bath was recommended, a laxative glyster was administered, and an aperient mixture directed to be taken in divided doses, which produced several copious evacuations by stool, and reduced the tension, and considerably relieved the soreness of the abdominal region. Nevertheless, the retention of urine still continued, caused, I apprehend, by a calculus lodged in the vicinity of the neck of the bladder; for every time the catheter was passed it was resisted by the presence of a stone, and little or no water could be extracted without first pushing the point of the instrument against it, and raising the stone from its situation, and keeping the instrument in this position till the bladder was emptied. By this manœuvre the impediment was surmounted, and the urine evacuated once or twice every twelve hours during several succeeding days, by the use of the common silver catheter, until I prevailed on my patient to be removed to the town (Blackburn,) where I had an opportunity of paying more particular attention to the urgency of the case. On his arrival, I introduced a flexible metallic catheter into the bladder, fitted with a small cork to plug up the end; the fore-finger being passed up the rectum, served to bend the apex of the instrument under the arch of the pubes, where it was permanently fixed, so that he could evacuate his urine *ad libitum*.

The indispensableness of the finger in the rectum, whilst passing the instrument, afforded me an opportunity of ascertaining the morbid indurated state of the prostate gland, which was greatly enlarged, and in a very rigid condition.*

* The symptoms of stone in the bladder, and a morbid condition of the prostate gland being in some respects similar, it is highly necessary that the surgeon should invariably pass the finger up the rectum prior to the operation, and if the gland be enlarged, it will be discovered with the greatest facility. By such timely investigation, the surgeon will be governed in the various stages of the operation, and thereby be enabled to form a pretty accurate idea of the determinate extent of the incision of the neck of the bladder, and necessary extension of the blade of the bistoury, prior to its introduction into the bladder.

The presence of a stone in the bladder may generally, by attention, be distinguished from an irritable state of that viscus; for in the former affection, and during the discharge of urine, the pain increases till the last drop is

Notwithstanding the antiphlogistic regimen was rigorously adhered to, there remained a considerable degree of soreness on the region of the pubes, attended with quick pulse and fever, insomuch that I did not then propose the operation of lithotomy, being aware of the consequences that might ensue from the attendant symptoms, excited by consequent irritation, the frequent effects of calculi, and a long distended state of the bladder; nevertheless, these unfavourable symptoms gradually abated, together with the tension of the abdomen, and the operation became admissible;* and after being determined on, and the preparatory regimen adopted, I performed it on the seventeenth instant (November), in the presence of two assisting surgeons and the necessary attendants. The patient being placed and secured in a horizontal position upon a steady table of commodious height, and supported by pillows with the breech projecting over the edge of the table, the first stages of the operation were conducted in the usual manner, and with tolerable facility. On the membranous portion of the urethra being laid open with the scalpel to the commencement of the prostate gland, the beak of the bistouri caché was inserted into the groove of the staff, the handle of the staff was taken hold of with the left hand, and raised from the right groin of the patient to nearly a right angle with the body; the bistouri was then carried gently forwards into the bladder and the staff taken out; the cutting edge of the bistouri being turned laterally towards the left ischium of the patient, and raised from its

voided; whereas, in the latter case, relief is observed in a reverse ratio,—for as soon as the water begins to flow the patient is somewhat relieved, and when the whole is evacuated there is no pain left, and the functions of the bladder are usually restored.

* Daily observation evinces, that simple irritation excited in the bladder, by the presence of a stone in that viscus, not unfrequently subsides on the primary exciting cause being removed by its extraction without impeding its functions.

It does not appear that a low degree, even of frequent irritation, excited by a stone in the bladder, is altogether unfavourable to the success of the operation of lithotomy, when performed during an interval of cessation from pain; but if there exist any nephritic affection, the danger is then manifestly increased, and the operation should be undertaken with great caution, and deferred, if possible, till such pain wholly ceases, and the consequent irritation of the system subsides.

sheath, it was withdrawn† nearly in a horizontal direction; and in executing this step of the operation, I perceived an unusual resistance‡ and grating sensation, as if cutting through a cartilaginous substance. The fore-finger of the left hand was now passed as high as possible into the bladder, through the opening made by the bistouri, and with difficulty the surface of a stone was felt; for owing to the man's state of corpulency, the greatest part of the hand became buried in the wound. The forceps were then carefully introduced by the side of the finger, which served as a guide to detect the stone. The finger being withdrawn, the stone was seized by the blades; but from the great expansion of the handles, I was led to believe that the calculus was either very large, or otherwise taken hold of in an unfavourable direction. To ascertain this incident, I endeavoured to reach the stone by insinuating the finger betwixt the extended blades of the forceps, but was opposed by the bulk of the prostate gland; for it appeared to occupy so considerable a space, that its extent could not be wholly traced by the finger in any direction. I therefore judged it expedient to let go the stone, and attempt to seize it in a less diameter, and after using every possible means in my power, I was obliged to abandon this project; and the extent and rigidity of the prostate, and its unyielding condition, induced me to enlarge the incision; for on every attempt to extract the stone, the body of the gland was brought forwards into sight, and appeared to completely wedge up the space betwixt the two rami ischii. Thus situated, and whilst the left hand was employed in gently drawing forwards the forceps along with the stone, the right was engaged in dilating the wound with the scalpel in a line with the external incision, where the resistance opposed

† The bistouri caché possesses an important advantage over the gorget, which no construction of that instrument can possibly surmount: for the surgeon has it in his power to adapt the blade of the bistouri to the exigency of every individual case, prior to its introduction into the bladder, and should the stone be suspected to be of unusual magnitude, or less than what was at first imagined, the screw of the handle may be moved whilst the apex is in the bladder, and the cutting part regulated accordingly.

‡ The enlargement of the prostate gland, in this instance, seems most probably to have been occasioned by the irritation which the long retention of the stones in the bladder had excited on the functions of that organ.

the chief obstacle; in this manner sufficient room was made, and the transmission of the stone effected. It was of an oval shape, and its long diameter 2.25, and its short 1.75 inches. A female sound was immediately passed into the bladder, and another stone detected larger than the first, and which was extracted with proportionate difficulty. It was also oval, but measured 2.6 inches one way, and 2.1 the other. From the different situations in which I had an opportunity of recognizing the prostate gland of this patient, both by the finger passed up the rectum and through the wound in perineo, its lateral lobes evidently projected considerably on the rectum, and it appeared the shape and size of the gizzard of a goose.* Several arteries were divided in the operation, which required the ligature; and there was a considerable oozing of blood, which appeared to come from the divided edges of the prostate gland. A canula was introduced into the wound, which by its pressure on the incised portions of the gland, prevented the blood from making its way into the bladder, and soon stopped the bleeding.

A plaster of lint, spread with cerate, was applied to the wound; the patient was then conveyed to bed, and his knees brought together, and secured by means of a tape passed round his thighs. A draught composed of sixty drops of tinct. opii was administered, and the patient left to take repose. On cal-

* Although a morbid enlargement of this gland may induce an unfavourable prognostic of the success attendant on lithotomy, yet is not an insuperable reason for its being altogether abandoned; for daily observation shews, that this organ, when indurated and enlarged, will frequently endure much violence with comparative impunity.

The symptoms characteristic of stony concretions in the bladder, and an indurated condition of the prostate gland, are sometimes confounded with each other. Hence will appear the necessity of discriminating betwixt these two diseases; and an attentive observer may generally form a tolerably accurate criterion, by attending to the nature of the discharge from the urethra; for in a disease of the prostate gland alone, the discharge is generally a mixture of viscid mucus and urine, and when connected with calculi in the bladder, it becomes frequently incorporated with sabulous matter.

A thickening of the coats of the bladder, even if it could be ascertained prior to the operation, yet ought by no means to prevent its being performed, unless connected with some other disease, for I have witnessed many cases of this description which terminated favourably.

ling in the evening, I was informed that the medicine had not produced sleep; he appeared restless, with quick pulse. There was no tension or pain about the region of the bladder, nor any hæmorrhage from the wound, and the urine flowed *guttatim* through the canula without interruption.

A warm bath was immediately procured in the room, into which he was put and remained twenty-five minutes, which afforded some temporary relief, but without producing syncope or diminishing the vibratory force of arterial action. On being removed to bed the opiate draught was repeated, but did not induce the least inclination to sleep the whole of the night. In the morning the canula was removed and the wound dressed as before. A saline mixture, with antimonial wine, was directed to be taken. An aperient glyster was administered for several succeeding days, and occasional purgatives exhibited to stimulate the torpid disposition of the intestines, all which produced their desired effects. The warm bath was repeated twice every twenty-four hours for ten days successively, and the antiphlogistic plan was strictly enjoined till the symptoms of fever and irritation subsided.

On the 20th instant, three days after the operation, a degree of soreness and tension manifested itself in the lower part of the abdomen, which extended along the urethra, and which assumed the appearance of peritoneal inflammation. But, on a minute investigation I was convinced, that the tension of the abdomen was caused by the parts of the wound connected with the operation being distended with inflammation, which wholly prevented the action of the bladder and voluntary power of the abdominal muscles from propelling the urine* through the

* I am induced to believe, that ischuria vesicalis, subsequent to the operation of lithotomy, is a very rare occurrence, and, so far as my inquiry extends, is scarcely noticed by any authors who have written on the after-treatment of patients labouring under this disease, and it being a circumstance which may be occasionally mistaken for peritonitis, seeing the symptoms, on a superficial inspection, bear some analogy to each other. Hence will appear the necessity, in every instance of abdominal affection, for the surgeon minutely to investigate the state of the bladder, and witness the discharge of urine from the wound or by the urethra. By strict attention to this particular, the morbid retention of urine may be distinguished from abdominal inflam-

aperture. Without hesitation I passed a female catheter up the wound in perineo into the cavity of the bladder, and evacuated more than a quart of limpid urine of healthy appearance. This unusual mode of assisting nature in relieving herself, was found necessary to be repeated every eight or ten hours for several succeeding days, until the tension and inflammation of the parts connected with the wound had subsided; after which the urine returned through the artificial aperture with comparative freedom. About three weeks from the time of the operation, a little urine made its way, at intervals, by the channel of the urethra, and the man seemed gradually recovering; when on a sudden a new train of symptoms came on, accompanied with inflammation and swelling of the right testicle, attended with violent obtuse pain, which produced a slight degree of fever and constitutional irritation of the system. Ten leeches were applied to the inflamed scrotum, and cloths moistened in a solution of ammonia muriata in vinegar and water were kept constantly applied to the affected part; a brisk purgative draught was administered, and a scanty regimen enjoined: yet every precaution used to disperse the swelling and inflammation proved unavailing, and suppuration was announced by frequent rigours, and the stricture of the testicle becoming less tense. A poultice was then applied, and renewed three times a-day, till a fluctuation of matter became perceptible, which was let out through an opening made with a lancet; the part soon healed, and the tension of the testicle gradually subsided; soon after which the left testicle became enlarged and painful, and assumed the appearance of a smooth solid substance. Leeches and other topical applications were assiduously applied, as in the former affection, and a mixture, apparently of pus and urine, was regurgitated* by the urethra,

mation, and by the introduction of a female catheter through the wound into the bladder, the water may be discharged as often as required, and till the inflammation subsides, by which means the patient will be relieved; and by neglect of this mode of manual assistance, inflammation of the bladder and abdominal viscera would inevitably follow, for there is much reason for believing, that serious mistakes have sometimes ensued from this species of retention of urine.

* I conceive it is not easy to explain the real cause of this malady of the

which continued for the course of eight or ten days, and then the inflammation and swelling gradually disappeared. From this period the wound in perineo assumed a granulating and healthy appearance, and the urine was voided voluntarily through the urethra in increased quantity; and in the space of ten weeks, from the time of the operation, the wound was completely healed, and the man returned home in a state of apparent good health, being able to retain his urine in considerable quantity, and propel it at pleasure. On a minute examination of the state of the prostate gland at this period, by the finger in ano, its size appeared very much diminished from what it was prior to the operation.†

I have lately had an opportunity of conversing with my patient, and he informs me, that some weeks past he parted with two small pieces of rough calculi by the urethra, and there is a deposit of sabulous matter in his urine, from which it appears probable that the disposition to the formation of stone still exists.

testicles, nor do I find such an occurrence mentioned by writers on lithotomy: however, I will hazard a conjecture, that in all probability some irregular particles of calculi, separated from the urine, might become entangled behind the veru montanum, and obliterate the orifices of the seminal ducts, and in this way produce irritation of the contiguous parts, or by sympathy the vas deferens might participate therewith, and the inflammation be communicated to the testis; for it appears likely that the matter was regurgitated through this duct from the testicle to the urethra.

† I am inclined to believe, that if the gorget had been used in this case, it would not have divided more than half of the left portion of the prostate gland, consequently the incision must have been quite inadequate for the extraction of the stone, and probably too small to admit the blades of the forceps without much violence; and owing to the indurated structure of the gland opposing such a degree of resistance to its introduction into the bladder, it is more than probable that, during the attempt to accomplish this step of the operation, the prostate gland must have been severed from its connection with the membranous portion of the urethra, and the posterior part of the bladder become transfixed.

On Painful Subcutaneous Tubercle.

By WILLIAM WOOD, Esq. Member of the Royal College of Surgeons, Edinburgh.

[From the Edinburgh Medical and Surgical Journal, for July 1812.]

THE disease which forms the subject of the present communication has not, so far as I know, been mentioned in the writings of any systematical or practical author, although it is not a very unfrequent occurrence, if I may judge from the number of cases which I have had an opportunity of seeing within the last twelve months. It appears to me to be well worthy of attention, both from the severe suffering which it causes to the patient, and from the singularity of the symptoms to which it gives rise.

The disease to which I allude, consists in the formation of a lump or tubercle, of a peculiar nature, in the subcutaneous cellular substance. This tubercle is met with in different parts of the body, but most frequently in the extremities. It is extremely small, generally of the size and form of a flattened garden-pea; and in none of the cases of which I have been able to procure a distinct account, larger than a coffee-bean. It is of a firm consistence, and is apparently quite circumscribed, being situated loosely in the cellular substance, immediately under the integuments, which retain their natural colour and appearance.

In the greater proportion of cases, there is no visible appearance of disease whatever, and it is only when the surgeon applies his finger to a particular spot pointed out by the patient, that he becomes sensible of the existence of the tubercle. In some few cases, however, although small, it is so superficially seated as to form a visible prominence.

As in all the cases with which I am acquainted, the tubercle had attained nearly its full growth before its presence was detected, I am unable to say, whether it is originally of slow or of rapid formation; but having acquired a certain size, it remains nearly stationary, undergoing hardly any perceptible increase of bulk, even in the course of a great many years; nor

does it ever show any tendency to affect either the skin or surrounding cellular substance. In one only of the patients whom I have seen, or of whose disease I have procured an account, has there been found more than one of these tubercles, and in that person there were present no fewer than three at the same time.

Trifling as the diseased part is, in point of size and appearance, it becomes the cause of very severe and even excruciating pain. So strongly is this pain represented by the patients, that we might be apt to imagine their statement exaggerated, did we not find them all concurring in the same representation, and most of them willing to submit to any operation that may be necessary to remove the cause of their pain. Two women in the lower rank of life came to me, even from a distance of above thirty miles, to have a consultation about this disease, and both of them expressed their willingness to submit to any temporary pain, however severe, which might remove their complaint.

The pain to which this disease gives rise, is extremely acute in the tubercle, and extends from it to a considerable distance along the neighbouring parts; it is not constant, but occurs in paroxysms. In general, at the commencement of the paroxysm, the pain is slight, but gradually increases till it becomes excruciatingly severe, and it goes off in the same gradual manner, leaving the parts in the neighbourhood of the tubercle, for some time afterwards, sore to the touch, as if they had been bruised. The paroxysms vary in duration from ten minutes to upwards of two hours; but they seem to increase both in frequency and severity, in proportion to the length of time the disease has existed.

Some of the patients have occasional intervals of ease for days or even weeks; in others the paroxysms occur several times in the course of one day. They generally come on spontaneously; but in one of the cases which I met with, they were sometimes induced by the friction of the clothes along the surface of the tubercle. They frequently attack the patient when asleep, in which case he is suddenly awoke by the severity of the pain.

The degree of pain produced by touching the tubercle is

different in different cases; all the patients whom I have examined allowing it to be freely handled, *in its ordinary state*, without feeling much uneasiness, but complaining of great aggravation of the pain, from either the tubercle or surrounding skin being even slightly touched *during the paroxysm*. Acute pain is produced at all times, by the tubercle being accidentally struck against any hard substance. One lady, of whose case I shall give a detailed account, conceives that the sensibility of the tubercle is materially affected by every change in the weather; whether from heat to cold, or from cold to heat. Several of the patients have stated, that they are sensible of an increase in the size of the tubercle *during the attack of pain*, and some of them have occasionally observed, at the same time, a degree of discoloration of the skin covering it, which became of a purplish or bluish cast; and although I have had no opportunity of ascertaining the truth of these statements from my own observation, I have no reason to doubt their accuracy.

It is a singular circumstance, that in all the cases which have come to my knowledge, with perhaps one exception, this species of tubercle occurred in females. It does not appear to be confined to any particular age, but it is frequently met with at an early period of life, and I have known it remain nearly unchanged for upwards of eighteen years.

From the very severe and almost constant suffering to which the patient is exposed, the tubercle frequently becomes the subject of operation, and fortunately it may be extirpated with perfect safety, no unpleasant symptom having ever, so far as I know, been produced by the operation. The patient becomes free from all pain and uneasiness as soon as the tubercle is removed, and, so far as experience yet goes, there seems to be no tendency to a return of the disease. In removing the tubercle, it is found to be quite detached from the integuments, and to be but loosely connected with the surrounding cellular substance, both of which are, to all appearance, perfectly sound. From this circumstance it is unnecessary to take away any portion of the skin, and only a very inconsiderable quantity of the cellular membrane. The wound frequently heals by the first intention, and, even in those cases in which suppuration

takes place, the cure is seldom prolonged for any considerable length of time. On dividing the tubercle with the knife, after it has been removed from the body, it is found to be of a pretty firm consistence, and it exhibits a uniform structure, somewhat resembling cartilage in appearance, but it is by no means so hard.

I shall now proceed to give a detailed account of the cases, from which the above history of the disease has been drawn up.

Case I.—Miss ———, a lady of about 30 years of age, consulted my father in the year 1809, on account of three tubercles, rather smaller than garden-peas, situated superficially under the integuments over the upper part of the gluteus maximus muscle. These were placed pretty near each other; they were quite movable, and the skin covering them was of its natural colour and appearance. She complained of frequent attacks of extremely acute pain in these little tumours, which extended from them to a considerable distance along the neighbouring parts. These attacks, sometimes occurred spontaneously, but were frequently also brought on by the friction of her clothes along the tubercles. She was recommended to try the topical application of mercurial ointment, but this not being productive of any relief, she most anxiously desired the removal of the diseased parts. The three tubercles, along with a considerable portion of the integuments and of the cellular substance, were removed by my father, by two incisions. The wound healed by the first intention, and the lady has never since had any uneasiness or return of her disease.

Case II.—BETTY HUNTER, a poor woman, above seventy years of age, came in autumn last, from a distance of above thirty miles, to have a consultation about a small tubercle of the size and form of a flattened garden-pea, situated superficially under the skin, a little above the inner side of the right knee. There was no visible appearance of disease on looking at the affected limb; the skin was of natural colour and appearance. The tubercle was quite circumscribed and very movable. When she applied to me for advice, she said it would appear strange that a woman, at her time of life, should have come

such a distance, on account of what would appear to me a perfect trifle, but that trifling as the little knot might appear, it rendered her life miserable, from the excessive pain to which it gave rise; and she added, that she would submit most willingly to any operation I might propose, that would remove her disease. She informed me that it was upwards of eighteen years since she first observed the little lump, and there was hardly any perceptible increase in its size since that time,—that it had not given her a great deal of uneasiness till within eighteen months, at which time she had become subject to occasional attacks of severe pain in the tubercle, extending from it to a considerable distance along the thigh and leg; that, for some time back, she had had regularly one paroxysm in the course of every twenty-four hours, which came on sometimes during the day, and at others during the night; that these paroxysms originally continued for about half an hour, but had gradually increased to upwards of an hour and a half, and had become excruciatingly severe. She enjoyed perfect ease in the intervals between the paroxysms. She never perceived, at any time, any alteration in the colour or appearance of the skin. She allowed the tumour to be freely handled, without complaining of much uneasiness.

Having pinched up the tubercle, I cut it out, along with a portion of the integuments, and afterwards removed a quantity of the contiguous cellular membrane. Partly from having removed so much of the cellular substance, and probably in part from the languor of the circulation at her advanced period of life, adhesion did not take place, and the wound assumed an indolent appearance. By means of poultices, however, and stimulating applications, it was brought into a state of suppuration, and was healed up in the course of 15 or 16 days. The skin and cellular substance which I had removed, were, on examination, found to all appearance perfectly sound. She has had no return of her disease.

Case III.—MRS. CRAIG, about 28 years of age, came to me in March last, from a considerable distance in Fife, on account of a tubercle of the size and form of a flattened garden pea, situated immediately under the skin over the middle of

the right leg, on its outer side. It felt firm but movable, and the skin retained its natural colour and appearance. Above seven years previous to my seeing her, she had become subject to frequent attacks of pain in the right leg, and soon afterwards she accidentally discovered the little knot, which had undergone very little alteration in size from that time. For several years back she had been subject to several paroxysms of pain in the course of every 24 hours, varying in duration from ten minutes to nearly three quarters of an hour; these she said had become exquisitely severe; they frequently attacked her when asleep, in which case she suddenly awoke in a fright, and occasionally found that she was screaming out from the severity of the pain. The pain was not confined to the tubercle, but extended to some distance both up and down the leg. By her account, the tubercle frequently became *visibly increased in size during the paroxysm*, and the skin covering it, sometimes at the same time, assumed a purplish or bluish hue. The paroxysms had been gradually increasing both in frequency and severity. I removed the tubercle, without taking away any part of the integuments, and a very small portion only of cellular substance. At the first removal of the adhesive straps the divided parts were found to have adhered, but there was a slight discharge of pus from the surface of the wound for ten or twelve days. She has not experienced the slightest uneasiness since the operation.

Case IV.—Mrs. —, a lady of about 50 years of age, more than twelve years ago, became subject to frequent attacks of pain in the right arm, which were supposed to arise from rheumatism. On this account blisters and other remedies were employed, but without any advantage. Some years afterwards she accidentally discovered a small lump, about the size of a small garden-pea, under the skin, on the middle and outer part of the right arm. At this time the attacks of pain were frequent; the pain was very acute, both in the tubercle, and in the surrounding parts upwards nearly to the shoulder, and downwards to the fingers; these parts felt sore to the touch for some time after the paroxysm had gone off; she occasionally also felt a degree of numbness in the fingers of the right hand.

She was ordered the topical use of mercurial ointment, but was at the same time recommended, if she did not soon get free of pain, to have the diseased part cut out. She conceived that she derived some advantage from the ointment; at least after its employment, the pain no longer extended downwards towards the hand, although it remained equally severe in the tubercle itself, and in the upper part of the arm. I saw this lady a few days ago; she informs me that she is never 24 hours free from an attack of pain, which lasts from half an hour to nearly an hour; that it is slight at the commencement of the paroxysm, but gradually increases until it becomes excessively severe, and after it has begun to abate it goes off gradually. The pain, during the paroxysm, extends a good way up the arm, which remains sore to the touch for some time afterwards. Although she complains of no uneasiness on the tubercle's being freely handled, *in its ordinary state*, exquisite pain is the consequence of either the tubercle or surrounding skin being touched even in the slightest manner, *during the paroxysm*. She says she does not think it possible for any person who has not experienced the pain of this disease to form any idea of its severity. The paroxysms frequently awake her from sleep. There is no visible appearance of disease on looking at the arm, but when the particular spot is pointed out, a tubercle a little larger than a flattened garden-pea, and more of an oval form, is felt rolling very superficially under the integuments, which she has never observed to undergo any change in colour or appearance. She thinks the tubercle a little larger than when she first perceived it; she informs me that it appears to her to be increased in size *during the paroxysm*, or at least that it becomes, at that time, more superficial than usual, although never visibly prominent.

These are the only cases of the disease which I have met with in private practice. I had an opportunity, however, of seeing another case in the Royal Infirmary in the course of last summer. The patient was under the care of my friend, Mr. Newbigging, one of the surgeons to that institution, with whose permission I insert the history of the case.

1811. About the middle of the left leg, over the *gastrocnemius externus* muscle, is a small movable tumour, about the size and shape of a garden-pea flattened, and of a firm consistence. It is situated immediately below the integuments, which are not in the least discoloured. She describes the pain as shooting from the part to the knee and upwards, at times so exquisite that she can scarcely bear it, particularly when the limb is cold, and has remained for some time at rest; it is always relieved by rubbing the part, and by the application of heat; says, that during the summer months she scarcely ever feels it, and her walking is not the least impeded by it. Her general health has been rather indifferent for some years past, which she ascribes to her rest in the fore part of the night, during the winter months, being so frequently interrupted by the pain of the limb. When she first felt it, which is between ten and twelve years ago, the knot was about the size of a pin's head; since then it has been slowly and gradually increasing. Knows no cause for the complaint, and has used no remedies except fomenting the part with vinegar about two years ago, which procured no relief.

"June 22.—The tumour was removed to-day; which on examination was found to be about the size and shape of a garden-pea, of a hard uniform texture, and resembling cartilage. The part was dressed with strap and bandage.

"June 24.—Last night the straps were removed on account of the pain they occasioned. The edges of the wound had become inflamed, swelled, and matter had begun to be secreted. An emollient poultice was applied.

"June 30.—Had for two days slight febrile symptoms, which are now gone; leg is looking better; inflammation gone.

"July 2.—Dismissed cured."

These five are all the cases in which I have had an opportunity of seeing the patient, and examining the diseased part; but being anxious to give as full and accurate account as possible of the symptoms and progress of this singular species of tubercle, I applied to my medical friends for information on the subject, and two of them, Professor Thomson and Mr. Newbigging, have been kind enough to favour me with a very distinct account of the disease, as it occurred in patients who

had come under their care in private practice. Cases VI. and VII. were drawn up for me by Professor Thomson, and case VIII. by Mr. Newbigging.

Case VI.—“Mrs. A. a lady of about 33 years of age, consulted me several years ago, on account of a small tubercle under the skin, on the middle and outer part of the left fore-arm. It was about the size of a small pea, was movable, and in general without pain. At times, however, it was so exquisitely painful, that she said she was unable to endure it. The attacks of pain came on chiefly in the night-time, and deprived her often of her sleep. The pain at these times extended downwards to the fingers, and upwards to the shoulder. I advised extirpation, which was accordingly done, but had no opportunity of afterwards examining the structure of the tubercle. This lady has ever since continued free from pain.

Case VII.—“Mrs. C. a particular friend of mine, about 57 years of age, has a small tubercle about the size of a coffee-bean, situated immediately under and now attached to the skin on the inside of the calf of the right leg. This tubercle is in general without pain, though at times it becomes exquisitely painful. It began about ten years ago, soon after she happened, by a violent effort, to rupture some of the fibres of the gastrocnemius muscle of the leg, near to the place where it is situated. This lady always feels pain in the tubercle for some time before and after changes of weather take place, whether these changes be from heat to cold or from cold to heat. During the periods of pain, which often last for some days, the skin surrounding the tubercle becomes exquisitely sensible to a considerable distance from it; the veins of the leg swell, and the tubercle itself has a slight blush of red. I have repeatedly advised extirpation, but have not been able to prevail on her to submit to it.

Case VIII.—“A married lady, about 40 years of age, had a small movable tumour about the size of a garden-pea, upon the outside of the right arm, a little above the elbow, seated immediately below the skin. She complained of frequent at-

tacks of severe pain in the tumour, shooting to the points of the fingers, and to the shoulders. The duration of these attacks varied much, but they seldom lasted for a shorter time than three or four hours, and sometimes the pain was little absent for several days together. The intervals between the paroxysms also varied much, being sometimes a week or ten days, and at others not more than 24 hours. She remarked that, although the skin was of its natural appearance, and not at all elevated, *during the intervals of ease*, yet it assumed a blue or purplish colour, and was visibly elevated by the tumour *during the fit of pain*. She was not aware of any cause which excited the paroxysm, but during its presence the suffering was much increased by the tumour being touched. Her attention was first drawn to the existence of the tumour, ten years ago, by the pain, which then resembled the sensation as if the part had been pricked by a needle. The paroxysms were at that time slight and rare, but in a short time they became more severe, and occurred nearly in the same degree for the last six or eight years. She remarked no change in the size of the tumour from the time she first observed it, till it was cut out about a year ago. The wound healed readily, and she has not had the slightest uneasiness since the operation."

It will be remarked, that in all these eight cases, this disease occurred in females. In addition to them, however, I have to mention, that my friend Mr. Gillespie informs me, that several years ago he had an old man under his care, in Gillespie's hospital, who had a small tumour under the skin of one of his cheeks, rather larger than a coffee-bean; that he remembers his occasionally complaining of very severe pain in it, which extended towards the eye and ear; that the pain sometimes left him entirely for several weeks, after which it would return in severe attacks, lasting with little intermission for several days. This man imagined the tumour to be enlarged during the continuance of the pain. These are all the particulars of his complaint which I have been able to procure, as Mr. Gillespie had not kept any notes of it. I think, however, from this account, there can be little doubt that it was of the same nature with the disease which I have just described, and which, for want of a better name, I have denominated *painful subcutaneous tubercle*.

Case of Epilepsy reduced to a regular periodical Form by a new Method, and cured under that Form by the Administration of Cinchona.

Read at the Sitting of the First Class of the Institute, the 5th of November, 1810, by M. DUMAS, Dean of the Faculty of Medicine of Montpellier, Professor of Physiology. &c.

[From the New Medical and Physical Journal, for March 1812.]

IT has long been generally known, and we have seen it confirmed by daily experience, that most obstinate chronic diseases may sometimes be changed into milder affections, and that this change is frequently sufficient for the complete removal of the disease. We are still ignorant, however, to what extent this principle may be applied. Very beneficial results may be obtained by reducing chronic diseases to the most simple form, such as a periodic or nervous affection, which may almost always be made to yield to the powers of medicine. The following case presents us with an instance of an irregular epilepsy changed into a periodical epilepsy, and becoming easily curable in this new form.

The efficacy of cinchona, in all diseases consisting of regular periodical paroxysms, is placed beyond all doubt: whatever may be the nature of chronic diseases, they seldom resist the curative action of this medicine, if the character of periodical accession is well marked. We have only therefore, by an appropriate method, to reduce epilepsy into a periodic form, similar to intermittent fevers; because, we possess a *specific* for these fevers as well as for all diseases in which periodic returns form an essential part.

During my stay at Bordeaux, in the year 1806, I was consulted by a young epileptic patient, whose history was rather remarkable. He was about 23 years of age, of a bilious temperament, strong irritable constitution, and of extreme sensibility. The affection of his nervous system had been derived from his parents; his mother was subject to frequent hysteric attacks; and his father had been troubled with spasms in the stomach and chest every month, until the establishment of an hæmorrhoidal flux in his 48th year had relieved him from them. The same nervous disposition was manifested during the infancy of my patient, by convulsive movements which took place

without any apparent cause, and also by his having been attacked three different times with an intermittent fever, which was removed by combining antispasmodics with cinchona. About the age of sixteen years, he was attacked with convulsions, which soon put on the appearance of epilepsy. In the intervals of the attacks he was subject to symptoms of lowness and vapours; very slight causes would excite the strongest emotions in him. He generally complained of an unpleasant sensation in the head and in the epigastric region, accompanied with spasms, dread, vertigo, sense of suffocation, watchfulness, &c. Flushing of the face, swelling of the eye-lids, heat and itching in the nostrils, and an eruption of pustules about the lips, were commonly the harbingers of a new attack. These attacks were at first irregular, generally produced by some accidental causes, as a fit of anger, an error in diet, or a strong emotion of mind. It was always observed that spirituous liquors, and especially the smallest quantity of punch, invariably brought on a fit of epilepsy. At the beginning the attacks were seldom, and did not observe any fixed periods of return. Previous to his 18th year the patient had not had more than seven or eight short fits, for which he had made use of baths, cooling medicines, antispasmodics, and spare diet. At this period the epilepsy, which had existed for two years, shewed itself under a real periodical form, and the patient had, during five or six months, a regular attack every fifteen or twenty days. These attacks did not appear at all to correspond with the changes of the moon.

This periodical form of the disease deserved attention, and ought to have influenced the treatment of it; it was, however, neglected, and instead of opposing the epileptic affection in a similar way with other intermitting diseases, by giving cinchona, the opportunity was lost, and only some empirical medicines were given. Three eminent physicians of Bordeaux were called to see the patient; they proposed to combine some antispasmodics with bitter tonics, the use of which diminished the number and violence of the paroxysms. Valerian, flowers of zinc, rhubarb and cinchona were given in combination. Had they given the cinchona alone in proper doses, the patient would have been cured.

The disease now ceased to be periodical, it recurred only at

very long intervals; seven or eight attacks took place in about sixteen months. The patient approached his 20th year, the age of the passions, and he gave himself up to them; he had a propensity to indulge in spirituous liquors, but their use brought on severe attacks of the disease. Punch, particularly, always brought on an epileptic paroxysm. The intervals between the attacks shortened, and the paroxysms at length became very frequent. After his 21st year, the patient generally had three or four in a month; sometimes he would have several in the same day. He was in this unhappy situation in 1806, when I saw and prescribed for him. An attentive examination of the case, led me to adopt two general principles, or elementary causes of this epileptic affection; the first, an hereditary nervous predisposition; and the other, a confirmed habitude of sanguineous and catarrhal determination towards the head. I therefore proposed a treatment conformable to these two principles, and which consisted in the administration of refrigerants, direct antispasmodics and revellents. Mucilaginous drinks, nitric lemonade, warm baths, frictions, camphor, assafœtida, orange leaves, pediluvia, repeated applications of leeches and blisters were the means I recommended to fulfil the two-fold indication. The treatment was to conclude with bitter and stomachic tonics to remove the geneal weakness of the constitution, and that of the abdominal viscera in particular.

This plan was followed with great regularity and punctuality, but without success; no alteration was produced in the disease; its attacks were neither less strong nor less frequent. Being again consulted I prescribed tonics, and particularly cinchona. The number and violence of the attacks were not in the least diminished by it. I then thought of trying a new method of treatment, which I was led to adopt by inductions and analogies drawn from the phenomena of the disease. I wished to convert it into a periodic epilepsy, and to cure it in the same manner as an intermittent fever. Several circumstances in the case seemed favourable to my views, which were also justifiable by the examples of chronic affections, wherein Nature works analogous changes. The indications and motives for this attempt will appear from the following considerations.

1. The eminently nervous constitution of the patient, which rendered him susceptible of periodic and intermittent diseases;

since intermission is a general law, which the immediate functions of the nervous system always obey, both in a state of health and a state of disease.

2. The intermittent fevers, to which he had been subject in his childhood, indicated a singular aptitude in him for this determined form of disease. There was reason to think, that as Nature had shown this disposition, it might be possible to establish the intermitting and periodic type in the existing disease.

3. This epilepsy presented all the characters of nervous affections, which have great affinity with intermittent and periodic diseases.

4 The fixed and regular attacks which occurred every fifteen or twenty days, when the patient was about 18 years old, indicated a sort of tendency to periods, which might be developed by art.

5. Spirituous liquors, particularly punch, possessed the power of bringing on paroxysms, and consequently furnished the means of producing them at pleasure.

Upon these circumstances, I founded the hope of bringing the diseases to a periodic form; I was certain of regularly producing paroxysms on determined days, by giving the patient spirituous liquors. Nothing was wanted but thus to produce the paroxysms sufficiently often to establish the habit of their returning at the fixed periods. The greatest difficulty was in deciding on what days there was the most probability of the paroxysms returning; I calculated in the following manner. An exact account had been kept of all the attacks of the disease. I found that the number of attacks in a year amounted to twenty-nine or thirty; dividing these into equal portions, it gave twelve or thirteen days for each of the intervals. I concluded then that this epilepsy would, if periodical, recur at the end of every twelve days; I therefore proposed to bring on a paroxysm every twelve days, for I thought this period the most favourable to their reproduction. I was confirmed in my preference for the period of twelve days by a curious circumstance, which had, at first, escaped my notice. The attacks of the disease had been stronger and more frequent during the last twenty months than before; but commencing from the first attack, the twelfth day, or its equal fractions, or its products when multiplied, were

the periods when the disease principally recurred. Thus I perceived that he often had one, two, or even three attacks on the twelfth day, afterwards on the sixth, and then on the third in the short intervals; when the intervals were long, the disease recurred on the twenty-fourth or the thirty-sixth day. The choice of the day for the production of the paroxysm, could be no more than conjectural; the circumstances I have stated, however, induced me to fix upon the interval of twelve days. It is possible that I might have equally succeeded by fixing on some other interval. It only remained for me to put in practice the means I possessed of producing the epilepsy in the patient.

I ordered him to take a certain quantity of punch, and thereby to produce a paroxysm every 12 days. At the same time, I endeavoured to prevent any attacks in the intervals, and directed some medicines proper for the purpose. For instance, there was always kept ready a composition of sulphuric ether, camphor, and assafoetida, to be given him on the least appearance of an attack; all the exciting causes were avoided, his diet was more mild and light than usual; amusements, journeys, the country air, bathing, pediluvia, and dry frictions were recommended to keep off the attack on the intermediate days. This treatment had a speedy and more happy effect than I could have hoped for; several attacks took place with an interval of twelve days, without any intermediate attack, or any inconvenience whatever. The quantity of punch given each time was gradually diminished, and the epilepsy still returned with the same regularity. At the end of three months, the punch was totally suppressed, and the disease still kept its regular periods. The periodical character became the essential and predominant affection. I then treated the disease as if it had been really an intermittent. I prescribed the bark during the intermission. The patient took half an ounce of cinchona the day after the attack, consequently, at the greatest distance from the next accession; he repeated this quantity for the first five days; the quantity was then reduced to two drachms daily until the twelfth day, when he took an ounce a few hours before the expected attack; to the cinchona was now added a little sulphuric ether and liquid laudanum. By these means, the force and duration of the paroxysms were diminished; and the patient felt a

degree of health and strength in the intervals, which he had not done before. At length, in place of a paroxysm, he had only slight vertigo, accompanied with contraction of the upper extremities. This vertigo in its turn ceased, and the disease completely disappeared. The patient has not experienced any return during the last two years. Nevertheless, I advise the bark to be taken occasionally, at those periods of the year, which precede the changes produced by the order of the seasons.

I do not recollect any instance of a patient being treated in a similar way; but the possibility of establishing a general method of treatment, applicable to the whole family of chronic diseases, may be deduced from many analogous facts: we have seen the most severe diseases, even those reputed incurable, leave the patient, after having changed their form into one more simple, either by the efforts of Nature, or the powers of medicine. The works of Medicus, Rhan, and some other French physicians, who have contended for the identity of all periodical affections, contain examples of chronic diseases, not at first in a periodical form, afterwards becoming so, and then giving way to the cinchona. It is well known at present, that the most obstinate chronic diseases may be cured by those means which are capable of bringing on a fever; that is to say, by reducing diseases to a febrile state, which did not before partake of the nature of fever.

The singular property which the punch and spirituous liquors possessed of bringing on paroxysms of this epilepsy, was one among the general effects of stimulants, which, by their application, are capable of producing an accession of nervous affections. Tissot relates, that he knew two nervous persons, who constantly experienced an attack of their disease, one by the impression of moist air, and the other by the impression of a dry air. Among the number of facts recorded concerning medical electricity, I recollect to have read of some persons, in whom the action of this fluid, whether natural or artificial, always brought on an attack of convulsions. I have seen the same susceptibility of electric excitation in an hysteric female, in whom the sparks constantly produced a paroxysm. These different methods, might undoubtedly be employed to induce periodically and at pleasure, a return of those diseases excited by them. But instead of confirming by cases taken from others,

the efficacy of this treatment, of which experience has shown me the advantages, I shall endeavour to reduce to a few fundamental principles, the immediate results of so remarkable a fact in the practice of medicine.

1. As nature sometimes changes the most severe and obstinate disease into more simple and curable affections, it may be possible for art to produce the same change, and thereby to render diseases capable of being more easily and completely cured.

2. The formation of chronic diseases must depend upon several different dispositions, which constitute their principles or elements. It is of consequence, therefore, to render predominant such one of these dispositions as is best understood by us, and against which we possess an effectual method of cure.

3. The periodical form is a determined condition of chronic diseases, whose character is best understood by us, and against which we are in possession of an efficacious and indeed specific treatment in the administration of the cinchona. It would, therefore, be highly advantageous to induce a periodical form in all chronic diseases little understood, and whose cure is difficult and protracted.

4. A chronic disease, as epilepsy, may be more easily brought to a certain form or new and favourable disposition, when this disposition has been shown in the course of the disease, or appears to belong to the constitution of the patient.

5. We have the power of producing the periodic form, and rendering it predominant in diseases, by applying, on certain determined days, means capable of constantly exciting an accession of the disease. This application will be almost infallible, if it has been shown by experience that the means employed have a particular aptitude to produce attacks of this kind.

6. The periods to be fixed upon as the most suitable for the production of these attacks, must be determined by a kind of calculation of the greater or less probability of the paroxysms returning spontaneously at those periods. Thus, having found the number of attacks in a given space of time, it must be divided into equal intervals, as if they had taken place periodically, and then we must fix upon those days on which they would have returned had the intervals really been equal.

SELECTED REVIEWS.

An Inquiry into the Changes induced on Atmospheric Air, by the Germination of Seeds, the Vegetation of Plants, and the Respiration of Animals. By Daniel Ellis. 8vo. pp. 246. Edinburgh and London. 1807.

Further Inquiries into the Changes induced on Atmospheric Air, &c. &c. By the same. 8vo. pp. 375. Edinburgh and London. 1811.

[From the Edinburgh Review, for November 1811.]

IN every stage of our inquiries into the properties of surrounding bodies, there is a certain portion of truth, which it is always in our power, by minute and accurate observation, to acquire; and when we have acquired this, our knowledge of the particular subjects investigated may be considered as complete; at least till new instruments or methods of investigation shall bring new phenomena within the sphere of our observation.

But if, on the one hand, it is only by full and correct observation, that we are led to the discovery of permanent truth, so, on the other, it will be found, that error of every kind is invariably referable to observation that is careless and imperfect. Thus it is, that, in the investigation of causes, some phenomena are occasionally overlooked which materially influence a result, and others admitted as essential to it, with which it is in no respect connected; that analogies and resemblances are sometimes conceived to exist between events, which are in truth extremely dissimilar; and that the wildest flights of fancy are sometimes permitted to occupy the place of those rational and legitimate hypotheses, which, if they are not the immediate anticipations of truth, are at least highly instrumental towards its discovery.

Obvious as these remarks undoubtedly are, we fear that the class of inquirers who are chiefly interested in the work before us, have but too seldom been fully aware of their importance. The science of Physiology—regarding it, in its widest extent, as that which treats of the functions or properties of animals

and vegetables—has always attracted a considerable share of attention; and yet there is none which has at all times abounded in so much extravagant theory. Even at the present day, we believe that there is no branch of knowledge more imperfect; nor any which, amidst a great, though slowly accumulated mass of curious and important truths, still retains so large a proportion of what is vague, fanciful, and erroneous.

It would not perhaps have been uninteresting, to have endeavoured to point out at length the causes which seem to have subjected this science in particular to such an imputation: but, for the present, we must content ourselves with observing, that we believe they may all be reduced nearly to the following:—That the various departments of the science have hitherto been considered in a manner too unconnected and irregular; and have been too little cultivated by persons capable of devoting an undivided attention to their investigation, and of studying all the functions of life in their actual connexion with each other. It is unfortunate, too, that Physiology has been regarded as the peculiar province of persons connected with the profession of medicine; for the most able and intelligent individuals of this class do not always cherish a partiality for physiological inquiries; or, if they do possess any taste for such pursuits, they are usually prevented from prosecuting them with success, by the labor or multiplicity of their practical duties. The truth indeed is, that, in the vast variety of phenomena exhibited by organized beings, anatomists, physicians, metaphysicians, chemists, opticians, and mechanical philosophers, have all found ample field for occasional investigation. Each have selected, for separate speculation or inquiry, those subjects which were most conformable with their habitual studies or occupations. To their talents and industry Physiology is indebted for a large share of the established truth of which it has to boast; but, at the same time, we are obliged to impute to the partial views of these very men, the greater proportion of the error with which it abounds.

If any thing, however, can contribute to render an imperfect science speedily perfect, it is the publication of inquiries conducted on the plan of those which form the subject of the present article. We scarcely know any work in physiology,

where an author has displayed a more extensive knowledge of every fact contributing, in the most remote manner, to elucidate the object of his investigation; in which, he has sought the opinions of others with more diligence, or stated them with more uniform candour; or where he has himself interrogated Nature, by experiments more judicious or more successful.

It is a fact, which has been long sufficiently known, that every thing which lives, whether animal or vegetable, requires, for the continuance of its life, a constant supply of fresh air. The great purpose of Mr. Ellis's Inquiry, is to discover why it is that air is necessary to the vital existence of organized bodies. In the present volumes, he has particularly in view, to show the precise nature of the changes which the air suffers, from the action of animals and vegetables upon it; and in what manner those changes are effected. The original 'Inquiry' was published in 1807; but the author has since that time, not only been led, in obviating the very few objections which have been urged to his doctrines, to the discovery of some new and interesting facts, but has corrected his original views by various additional experiments. The result of the whole we shall endeavour to lay before our readers in as few and as plain words as possible.

In the human body, from the first to the last moments of its existence, we remark, that a certain quantity of air is alternately rushing into and out of the mouth and nostrils. The chest, or thorax, is so constructed, that, merely from the elasticity of its sides, and the pressure of the surrounding parts upon them, it has a tendency to assume a certain permanent capacity or dilatation. Accordingly, after death, when there no longer exists any counteracting cause, this is the capacity which it assumes and retains. We may call it the natural state of the thorax. In the living body, however, it is found that, by the action of the surrounding muscles, a further enlargement of the chest, beyond its natural state, may be produced. As soon as this dilatation commences, it is obvious that a sort of *vacuum* must be formed between the sides of the thorax and the lungs. A current of air, therefore, immediately flows through the windpipe into the air-cells of the lungs, and

gradually distends these organs, in proportion as the cavity containing them is increased. This constitutes what is denominated Inspiration. The quantity of air which is inhaled, in any single inspiration, is of course determined entirely by the extent to which the chest is dilated. In individuals who are healthy and at rest, inspiration consists merely of a gentle enlargement, produced by a partial contraction of the diaphragm; and such may be termed an Ordinary Inspiration. The quantity of air, which rushes into the lungs during an inspiration of this kind, is very different in different individuals, according to the size of their chests, or the extent to which the diaphragm contracts, in the inspirations of each. It has been variously estimated, in adults of a middle stature, at 13, 17, 20, 35, and 40 cubic inches; affording 25 cubic inches as a mean. But all these calculations have not been founded on equally satisfactory data. Dr. Menzies's experiments alone, which estimate the average bulk of an ordinary inspiration at about 40 cubic inches, seem to have been performed in an unexceptionable manner: and we place the more confidence in his calculation, that we have found it to correspond with some late experiments of our own. In larger inspirations, the thorax is increased in all directions; and the average bulk of air, at temperature 60 Fahrenheit, which is inhaled by the utmost possible inspiring effort, or by what may be called an extreme inspiration, is probably about 130 cubic inches.

After previous enlargement, the cavity of the thorax may be diminished by the pressure of the abdominal viscera, the elasticity of the parts with which the ribs are connected, and the muscles which pull these bones downwards, exactly to its natural capacity, or even considerably below it. When the diminution commences, the lungs are compressed; and the air, being thus forced out of their cells, escapes by the trachea and mouth. This constitutes Expiration. In health, and during rest, it consists of a reduction of the thorax to its natural state only; and this seems produced merely by the compression of the relaxed diaphragm, and the elasticity of the cartilages and softer parts affixed to the ribs: consequently, the quantity of air expelled is exactly equal to the quantity previously inhaled. Such may be called an Ordinary Expiration. In all larger

expirations, where the chest is compressed below its natural state, the compression is produced and sustained entirely by the action of powerful muscles, drawing down the ribs, and forcing the diaphragm upwards; and, as soon as these muscles cease to act, the thorax returns to its natural state again. We are inclined to think, from experiment, that the quantity of air which, on an average, is expelled by an extreme expiration, after a previous extreme inspiration, is about 260 cubic inches. It is to be remembered, however, that we cannot, by any muscular effort whatever, reduce the dimensions of the chest so far, as to empty the lungs entirely of their contents. After the most violent expiration, a considerable quantity of air still remains within their cells; nay, it is found extremely difficult to expel this residual air altogether, even by subjecting the lungs to very great compression, after they have been removed from the body. That, after an extreme expiration, they still retain, on an average, about 40 cubic inches, seems probable, from considering both the structure of the lungs, and the extent to which the thorax seems capable of being diminished by muscular action, as well as the result of an experiment of Mr. Davy.

These two processes, of inspiration, and expiration, generally alternate with each other, while the body is at rest, about 20 times in a minute. If therefore, we adopt 40 cubic inches, as the average bulk of air inhaled and exhaled, it will follow, that a full grown person respires 48,000 cubic inches in an hour, or 1,152,000 cubic inches in the course of a day; a quantity equal to about 79 hogsheads.

It has been long ascertained, however, that the air which is emitted by expiration, does not possess the same properties as that which has been inspired. Now, the only gaseous substances which chemists have hitherto found existing, permanently and uniformly, in the atmosphere, are oxygen, nitrogen, and carbonic acid; the relative properties of which may be judged of from the analysis of one cubic inch, which gives nearly $\frac{21}{100}$ of oxygen, and $\frac{79}{100}$ of nitrogen, with a quantity scarcely perceptible of the acid gas. What, then, is the precise nature of the changes which this atmospherical air undergoes, when it is received into the lungs?

That air which has been breathed is loaded with moisture, seems at all times to have been generally known. Upwards of fifty years ago, the celebrated Dr. Black demonstrated, that it was also combined with much more carbonic acid; and Dr. Priestley proved, in 1776, that it contained much less oxygen than the air inhaled. Yet, at the publication of Mr. Ellis's Inquiry, physiologists had not established, either the proportion of these gases existing in it, or the composition and quantity of the vapour with which it is united; nor had they ascertained what relation its nitrogen bore to that of the surrounding atmosphere. It appears, indeed, to have been the prevalent opinion, that a given quantity of atmospheric air, in passing once through the lungs, lost about $\frac{1}{8}$ th part of its bulk of nitrogen, about $\frac{1}{10}$ th of oxygen, and gained nearly $\frac{1}{3}$ th of carbonic acid; 100 cubic inches, for example, losing 1.47 cubic inches of nitrogen, and 9.117 cubic inches of oxygen; while they acquired 7.647 cubic inches of carbonic acid, by a single respiration. This conclusion was deduced chiefly from experiments performed by Mr. Davy; in which he found, that when he applied his mouth to a tube connected with a mercurial air-holder containing atmospheric air, and made a single inspiration and expiration from and into this vessel, as much in the manner of ordinary breathing as possible, the contents of the air-holder were diminished in bulk, and contained less nitrogen and oxygen, and more carbonic acid,—nearly in the proportions just stated. To the deductions which had been made from such experiments, in as far as they related to the disappearance of nitrogen, Mr. Ellis had objected, that they were such as the results obtained did not warrant; since there was no proof, that the chest was reduced exactly to the same capacity after as before the experiments; and we could not therefore infer, that the nitrogen gas which had disappeared from the air-holder was not to be found in the lungs. We wish he had extended this obvious and substantial objection, to the inferences which had been drawn from the same experiments regarding the proportions of oxygen and carbonic acid; for it appears in all respects equally applicable to them. If a small quantity of the nitrogen of the inspired air remained in the lungs, merely because the thorax was of larger dimensions

after than before the experiment, for the same reason a portion of oxygen, or carbonic acid, which otherwise would have been found in the air-holder, might have been retained in these organs.

Two memoirs on this subject, the joint production of Seguin and Lavoisier, were read to the Academy of Sciences of Paris, in 1789 and 1790; and Laplace has preserved the results of those experiments, in prosecution of the same inquiry, with which the philosopher last named was engaged when he was dragged to the guillotine;—experiments which he himself would have communicated to the world in detail, had not the short respite of a few days, which he requested for that purpose alone, been with such unprecedented barbarity denied. It would have been agreeable to us, if we could have attached any value to these investigations of two chemists so celebrated. But that caution which ought to be inseparable from every philosophical pursuit, precludes our placing the least reliance on results of experiments, when they are not detailed with the most circumstantial minuteness. We honour the memory of Lavoisier, and respect the talents of his surviving coadjutor. But their memoirs to which we have alluded, will hereafter be read, chiefly because they are among the last labours of one of the greatest philosophers of the eighteenth century. And, indeed, it is impossible to observe the tone of enthusiasm which these essays have in some parts received, from the prevailing spirit of the times in which they were written, without melancholy reflections—without feeling again awakened in us those emotions of deep regret with which the recollection of that period of disappointment must ever be contemplated.

As we never can be assured that the capacity of the lungs is the same after as before the experiment, we cannot decide, with certainty, how far the relative proportions of the gases in the air expired, may not have been influenced by this cause. But it is obvious, that if the diminution which may have been observed in the bulk of air by one inspiration, depended on any natural and constant process in the animal economy, by which air is continually abstracted from the cells of the lungs, the reduction in volume which would take place, in breathing a large quantity of air, would be directly proportional to the

number of respirations necessary to transmit the whole of this air through the lungs. Whereas, were it dependent on any such accidental circumstances as we have now alluded to, no such increase ought to be observed: the diminution might even be least, when the quantity of air inspired was largest; and, at all events, we should not expect to find it, in any instance, exceeding 20 cubic inches, or half the bulk of an ordinary inspiration. This point has been determined, in the most satisfactory manner, by the experiments of Messrs. Allen and Pepys. About three years ago, they constructed an apparatus, by which from 3000 to nearly 10,000 cubic inches of atmospheric air could be transmitted once through the lungs, by easy respirations, beginning and ending with a forced or extreme expiration: And, of thirteen experiments of this kind which they performed, the greatest deficiency in the expired air appeared in one where 3360 cubic inches had been inspired, in which it amounted to 62 cubic inches; in another, where 3620 cubic inches had been breathed, the diminution was only 4 cubic inches; and, in a third, 9890 cubic inches lost only 18. But, although it is thus established, that there is one cause to which the diminution is not owing, we do not feel ourselves entitled to assert, positively, that, in all these instances, it ought to be ascribed solely to the difference between the extent of the expiration immediately preceding, and of that closing the experiments. It may, hereafter, be shown to be dependent on circumstances entirely different. In the mean time, it may be remarked, that even the greatest deficiency in these experiments was not equal to half the difference between an ordinary and an extreme expiration.

When too large a volume of air is breathed only once, and in the manner practised by Messrs. Allen and Pepys, any slight variety in the proportions of the gases composing the small quantity of air which may be retained in the chest, can very little affect the composition of the much greater bulk which has been exhaled. The analysis of this expired air may therefore be regarded as affording a very satisfactory illustration of the changes which air in general undergoes, in its passage through the lungs during natural respiration. Accordingly Messrs. Allen and Pepys have demonstrated, by experiments

which seem to be unexceptionable, that, by its transmission through the lungs in ordinary breathing, the air loses about 8 per cent. of oxygen, and acquires an *exactly equal* bulk of carbonic acid, while its nitrogen remains unaltered. They conclude, that 39,534 cubic inches of carbonic acid are emitted daily from the lungs of a full grown person. But we perfectly agree with Mr. Ellis in his objections to this calculation, and are inclined to estimate the average quantity at about 92,160 cubic inches.

Not being acquainted with any attempt, since the imperfect trial made by Mr. Abernethy, to ascertain the composition of the fluid which is brought off by the expired air in the state of vapour, we lately subjected a small quantity of this fluid to accurate analysis. For this purpose, we made a full grown person, in perfect health, expire through a thin glass tube, about three feet in length and a quarter of an inch in diameter, kept at a low temperature, by the evaporation from a slip of muslin moistened in spirits of wine, which was wrapped round it. In four hours, an ounce measure of a perfectly transparent, colourless, and insipid fluid, of the consistence of water, was collected in drops from the extremity of the tube. This fluid did not produce the least alteration on the colours of litmus or turmeric paper. It suffered no change on the addition of corrosive muriate of mercury, tannin, or nitrate of silver. And when a small glass, containing half an ounce of it, was connected, by filaments of moistened cotton, with other two glasses containing each about two drachms of pure water, and these were then attached to the opposite extremities of a galvanic battery, consisting of 24 four-inch double plates of copper and zinc, charged with diluted muriatic acid; at the end of four hours, we could not detect the slightest indication of the presence of albumen in the negative, or any saline substance in the positive glass. Hence we have been led to conclude, that the fluid dissolved in the exhaled air is pure water.

All those animals which suckle their young, constituting the class Mammalia,—for example, the ape, the horse, the dog, the mouse, the seal, and the whale; Reptiles, such as the turtle, the lizard, the frog, and the snake,—and the whole class of Birds,—are provided with organs resembling the lungs of

man, into which they are constantly, during life, receiving fresh air. Analogy alone, therefore, would lead us to suppose, that these animals produce similar changes on it by their respiration. But this inference is in a manner confirmed, by the appeal which Mr. Ellis has made to the experiments of various physiologists on rabbits, guinea-pigs, rats, mice, sparrows, vipers, tortoises and lizards; and by some very neat experiments of his own on toads and frogs. In all these it appeared, that the nitrogen of the air respired suffered no change, but that a quantity of oxygen was removed,—and a volume, nearly or exactly equal, of carbonic acid substituted in its place.

The opinion which seems to have prevailed almost universally of late years, is, that, during respiration, a portion of the oxygen or nitrogen of the atmosphere, or a quantity of the compound atmospheric air itself, actually passes out of the lungs into the blood vessels of these organs, and is combined with or absorbed by the blood; and respiration has been familiarly spoken of as a process analogous, if not absolutely identical, with that of combustion. This combination being assumed as a fact, a variety of other phenomena, more or less at variance with actual experience, have been supposed to succeed or accompany it. According to one hypothesis, the carbonic acid exhaled *might* have existed ready formed in the blood of the pulmonary arteries; and the blood might have a stronger attraction for oxygen gas than for carbonic acid, and, combining consequently with the oxygen of the air, might part with the carbonic acid, which would as easily pass *from* the vessels into the cells, as the oxygen from the cells *into* the vessels. Another doctrine supposed, that a portion of oxygen being attracted by the blood in the lungs, was combined, during the circulation of that fluid through the other parts of the body, with a portion of carbon, so as to form an oxide of carbon; which, on being brought back to the pulmonary vessels, was there united with an additional quantity of oxygen, assumed the state of carbonic acid, and was discharged. In like manner, it was conceived by some, that the water emitted in the state of vapour might be formed by the union of a portion of absorbed oxygen with hydrogen existing in the blood, so as to constitute an oxide of hydrogen, which, on passing into the

pulmonary arteries, combined with another portion of oxygen, and was then exhaled. And, finally, with respect to the nitrogen, some were of opinion, that while the blood actually attracted a large volume of this gas out of the cells of the lungs, it combined only with a small portion of it,—the remainder passing back into the cells again; while others thought it more probable, that no more was absorbed by the blood from the cells, than this fluid permanently retained.

This rapid and easy transmission of gases through the sides of the cells, and vessels of the lungs, which is the common foundation of all these theories, Mr. Ellis maintains, is not only totally devoid of proof, but if sound philosophy only allows us to conjecture, respecting phenomena unseen, from what we have experienced of similar events actually perceived, that it is not legitimate to entertain it, even as an hypothesis. Dr. Lower had indeed observed, that when dark-coloured blood was brought into contact with atmospheric air, it assumed a florid colour; and various other physiologists after Priestley, had proved that this, or any other air containing oxygen, so exposed, lost part of its oxygen, and gained carbonic acid. Lower had also demonstrated, by experiments on quadrupeds, that the change of colour from modena to a scarlet red which the blood underwent in the lungs, depended entirely on the presence of fresh air in their cells: And Priestley found, that when a quantity of dark-coloured blood was tied up closely in a moistened bladder, and hung in the air, the whole lower surface of the blood acquired a coating of a florid red colour, as thick as if no bladder had intervened. From all this, it had been inferred, that, during respiration, either some part of the air passed through the sides of the cells and vessels of the lungs into the blood, or that something was given out by the same course, from the blood to the air, so as to alter the colour of the one, and the composition of the other. But, without denying that, in these instances, the change of colour in the blood depended on the presence of the atmospheric air, or of air containing oxygen, Mr. Ellis has shown, by the most satisfactory experiments, that, in the case where the bladder intervened, neither did the air afford any portion of its gases to the blood, nor did the blood communicate any matter to the air. Thus, when he

put a quantity of black blood into a small bladder, and suspended it in a glass jar containing 13.1 cubic inches of atmospheric air inverted over mercury, he found that the blood soon reddened; that, at the end of two days, the whole of the oxygen of the included air had disappeared—but that an equal quantity of carbonic had been formed. Hence it is obvious, that as all the oxygen which had disappeared was converted into carbonic acid, none could have penetrated the bladder, or combined with the blood. On the other hand, when Mr. Ellis suspended, in the same manner, bladders filled with water, or bladders empty, but moistened, in jars of atmospheric air, the oxygen was equally found to be converted into carbonic acid. Since, therefore, it thus appears that a moistened bladder is of itself capable of affording carbon to form carbonic acid with the oxygen of the air, there is no reason for supposing, that the carbon is derived from any other source, where the bladder is filled with blood; and the conclusion seems irresistible, that when dark-coloured blood is reddened by the air, through the sides of a moistened bladder, the air yields no oxygen to the blood, nor acquires from it any carbon; but the carbon of the bladder, by its combination with the oxygen of the air, passes into the state of carbonic acid gas. The doctrine, then, of the entrance of gases into the blood from the air cells of the lungs, can no longer be regarded as receiving the best support from Priestley's experiment. But although the result had been otherwise, and the direct passage of something through the bladder had been unequivocally proved, we should still have been disposed to maintain with our author, that it would not necessarily follow, that any similar transmission of air took place through the sides of the cells and vessels of the lungs. On the contrary, we regard it to be a fact, as well established as any in Physiology, that no part of the body, provided with vessels, however delicate it may be, has ever been observed to permit the smallest quantity of any kind of fluid to permeate through it, as long as the circulation continues in that part; though, as soon as death has taken place, transudation goes on in all textures with the utmost facility. We should not therefore, be entitled to infer, merely because a dead bladder may

seem to allow of the transmission of air, that the cells and vessels of the living lungs are equally permeable to that fluid.

Mr. Davy had concluded from experiment, that 71 or 93 cubic inches of nitrous oxide might, in the short period of half a minute, be absorbed by the venous blood, through the moist coats of the pulmonary veins. Our author's observations, alone, would have left very little doubt in our minds, that, in these experiments, though a portion of gas had disappeared from the air-holder, none had passed into the vessels of the lungs. But we have, ourselves, found, by repeated trials with nitrous oxide and atmospheric air, that, when a given quantity of either of these is frequently breathed, the desire, or sympathetic stimulus to inspire, becomes gradually so strong, and the expirations proportionally so short and restrained, that, at last, when the experiment is terminated from fatigue, the lungs may contain, in some instances, even twice as much air as at the commencement. It is obviously from inattention to this circumstance, that Messrs. Allen and Pepys, in their late investigations, have been deceived into the conclusion, that, when atmospheric air is breathed in this laborious way, a portion of oxygen is absorbed;—a conclusion which, had not Mr. Ellis shown it to be matter of hypothesis and not of fact, we do not hesitate to say, would have led us to doubt the accuracy, even of two of the most eminent chemists in the island.

At the present day, we believe, there are not many who suppose, that any part of the air is conveyed into the blood by the channel of the absorbent vessels: Yet Mr. Ellis has thought it necessary to point out how little grounds there are for such an opinion. We are aware, that experiments upon dogs have been referred to in support of it;—in which, air introduced into the cavities of the pleura or peritonæum, has disappeared in a few days. But we should almost have thought a reference of this nature quite unnecessary, when it is so generally known, that, sometimes, in the human body, in consequence of a very trifling laceration of the lungs from a broken rib, such a quantity of air escapes from the chest into the cellular membrane under the skin, as to blow it up over the whole surface, to the depth of nearly a foot; and yet all this air is gradually re-

moved; so that the body, from having the appearance of a huge bladder fully inflated, in a few days recovers its natural form. Still these phenomena are far from demonstrating, that air, in an elastic state, is taken up by the absorbents of the lungs during respiration.

Having thus shown, that the fundamental principle of all the prevalent hypotheses, respecting the manner in which the air is altered by natural breathing, is inaccurate, Mr. Ellis's simple and most satisfactory deduction on this point may be stated in a few words. Air, examined after respiration, is found to differ from the same air before it is breathed, in having lost a portion of oxygen,—gained an equal volume of carbonic acid,—and in being loaded with watery vapour. This additional carbonic acid, then, is either given out directly by the exhalent vessels of the lungs, or it is actually formed within the air cells. Now, it is not directly emitted from the vessels; for in that case it ought to be discovered in the air expired, whatever the composition of the air inspired may have been: But this is not so; for no carbonic acid is exhaled when hydrogen is breathed. It must, therefore, be formed within the cells. If so, the oxygen entering into its composition must be derived from the air inhaled; for it is not generated, unless that air contains oxygen; and the quantity of oxygen which is lost by the inspired air, is exactly equal to that of the carbonic acid emitted. On the other hand, the carbon with which the oxygen combines, must be supplied by the lungs; and Physiology does not permit us to suppose, that this supply is accomplished in any other way, than by an exhalent secretion from the branches of the pulmonary artery, opening on the surface of the air cells. In what state the carbonaceous matter is secreted, whether purely as carbon, or in combination with other substances, is yet uncertain. Here, however, it may be proper to remark, that since we have estimated, that about 92160 cubic inches of carbonic acid are formed, by the direct combination of its constituent principles, within the air cells of the human lungs, in the course of 24 hours, it follows, that as much latent heat is daily set free, within these organs, as would melt 201.03 lib. troy of ice. Lastly, with respect to the water which is found dissolved in the expired air, we may observe,

that we cannot regard it as formed by the union of the oxygen inhaled, with hydrogen present in the air cells; for all the oxygen which disappears is employed in forming the carbonic acid. In consistency with physiological principles, therefore, we must suppose, that it is poured out on the surface of the cells, either in the state of pure water, or holding other substances in solution, by an exhalent secretion from the vessels of the lungs.

We cannot leave the consideration of the changes produced on the air by animals provided with lungs, without adverting to another very singular alteration, which Mr. Ellis has, with great ingenuity, suggested that it may undergo, from its introduction into these organs. Messrs. Allen and Pepys had found, that when they respired pure oxygen, a quantity of nitrogen considerably greater than what could reasonably have been supposed to have existed in the lungs before the experiment, was mingled with the expired air, and that an equal bulk of oxygen gas had disappeared. In like manner, when a guinea-pig was made to breath pure oxygen, or a mixture of this gas and hydrogen, the expired air contained a volume of nitrogen much more than equal to the cubic contents of the animal's body, and had lost a proportional bulk of oxygen or hydrogen. It was observed, too, that the emission of nitrogen was always greatest in the first expiration; and that its quantity progressively diminished, until, towards the close of the experiment, it was reduced almost to nothing. Far from regarding these phenomena, with Messrs. Allen and Pepys, as proving an evolution of nitrogen from the blood, and a corresponding absorption of oxygen or hydrogen, Mr. Ellis infers, with more accuracy, that the nitrogen must have been derived from the residual air in the lungs, and that it has been displaced from the cells by the mere mechanical substitution of the other gases. But if this inference be just, since a much greater volume of nitrogen was emitted, than the lungs could have contained of that gas in an elastic state, we cannot but suppose, as has been argued by our author at great length, that these organs exert, upon inspired air, a property similar to that which chemists have proved pieces of porous charcoal to

possess, namely, a power of attracting and *condensing* several times their volume of atmospheric air, oxygen, hydrogen, nitrogen, and various other gases. Hence, though the lungs do not contain a greater *bulk* of air than has commonly been supposed, yet they may, in fact, contain a greater *weight* of that elastic fluid. Mr. Ellis will not be displeased to learn, that this analogy had occurred, many years ago, to one of the most judicious of the French physiologists, M. Hallé. Among a list of questions connected with respiration, which he proposes for resolution, we find the following:

‘ Dans les altérations qu’éprouve l’air dans la respiration, ‘ en est-il qu’on doive attribuer plutôt au poumon qu’au sang? ‘ et indépendamment de l’humidité pulmonaire, la propriété ‘ singulière qu’ont la plupart des corps spongieux d’absorber ‘ les gaz et de leur faire perdre l’état élastique, ne peut-elle pas ‘ entrer pour quelque chose, dans les fonctions que le poumon ‘ remplit dans la respiration?’ *Encyclop. Meth. Medecine*, I. 506.

Land animals of the classes of Insects, Mollusca and Vermes, and Terrestrial Ova, Larvæ and Chrysalids of insects, operate upon the surrounding air, either by receiving it into cavities, which they can enlarge or diminish at will like lungs; or into tubes, called tracheæ, opening externally by orifices or stigmata; or the power of acting upon it seems possessed by the whole surface of the body.* There can be little doubt, from the numerous experiments which our author has detailed on bees, flies, grasshoppers, slugs, snails, earth-worms, and various larvæ and chrysalids, that all these, like man, remove, by their respiration, a certain quantity of the oxygen of the air, and substitute a corresponding bulk of carbonic acid, leaving the nitrogen unaltered. But it is certain that they produce no carbonic acid, unless when in contact with air containing oxygen. It is most consistent with analogy, therefore, and it is in

* We have adopted the classification of animals, which will be found proposed under that article in Dr. Rees’s Cyclopædia, composed, we presume, by Mr. Macartney. It seems to us superior to any that has yet been offered to the public. In applying the terms *Land* or *Terrestrial* to animals, we wish them to be understood as designating those which are killed by immersion in water, in opposition to the *Aquatic* class, or such as die merely from being removed out of that fluid.

no respect incompatible with the anatomy or physiology of these animals, to suppose, that, in changing the surrounding air, they merely afford to it, by a process like secretion, a certain quantity of carbonaceous matter, which, uniting with its oxygen, constitutes an equal volume of carbonic acid.

The water of springs, rivers, and of the sea, always contains from $\frac{1}{28}$ to $\frac{1}{36}$ part of its bulk of an air, composed of from $\frac{3.4}{100}$ to $\frac{3.6}{100}$ of oxygen, from $\frac{5.6}{100}$ to $\frac{5.9}{100}$ of nitrogen, and from $\frac{1.0}{100}$ to $\frac{1.0}{100}$ of carbonic acid. Now, all aquatic animals, such, for example, as the whole class of fishes, many insects, mollusca, vermes, and zoophytes, and several aquatic ova of land animals, are constantly producing changes on this air contained in their natural element. Fish act upon it through the medium of organs familiar to every one, called gills; and the animals of the other classes, either by means of organs like the gills of fish, or of tubes like the tracheæ of many terrestrial insects; or by a structure, too minute to be seen, existing on all parts of their surface. With respect to the alteration which they effect, Mr. Ellis has quoted a variety of experiments on different kinds of fish, muscles, marine testacea, snails, leeches, zoophytes and tadpoles, in which it was found, that the water in which these animals were placed, lost a part of its oxygen, and received an addition of carbonic acid, while its nitrogen remained unaffected. It was not actually demonstrated, in these instances, that the quantity of carbonic acid produced, exactly equalled the oxygen which had disappeared; but we confidently infer, with our author, that this was the extent of the change. Nor have we less hesitation in concluding, that the carbonic acid was formed, by the combination of carbon separated from the animal by the vital process of exhalation, with the oxygen of the air contained in the water. And here we cannot refrain from quoting the beautiful provision of nature, which Mr. Ellis has developed. The experiments of Scheele and others had shown, that water possesses a superior attractive power for oxygen; and that, as it attracts this gas, it parts with its carbonic acid: so that the latter never exceeds a certain quantity, in the water either of springs or of rivers. And hence, says Mr. Ellis, 'the noxious gases, formed in water by the exercise of the animal functions, and by the de-

‘composition of organic bodies, are regularly expelled; and
‘thus the air, destined to support the living functions of aqua-
‘tic animals, like that of the atmosphere which we breathe, is
‘maintained nearly in a uniform state of composition and
‘purity.’ § 558.

The experiments of Hooke and Spallanzani, referred to by our author, prove, that the order of zoophytes called Infusoria, such as the animalcules of vegetable infusions, of vinegar, and of stagnant waters, are killed by placing these fluids in a vacuum, or stopping them up closely in a phial. And, in the absence of any direct proof, we may presume, that, like other animals, they exhale carbon, which combines with oxygen existing in the medium in which they live, and forms carbonic acid.

Lastly, we think it extremely probable, that those detached and apparently irritable substances, called Hydatids, so frequently discovered in diseased parts of other animals, and which might with propriety be constituted into an order of zoophytes under the name of Parasitica, act in a similar manner upon oxygen contained in the fluids which surround them.

Thus Mr. Ellis has conducted us, by satisfactory experiments, and the most reasonable analogies, to this great inference, that every individual in the animal kingdom is continually exhaling carbon, to form carbonic acid with the oxygen of the atmosphere, or of the air existing in the fluids in which it lives.

We should now willingly have followed our author through the various stages of his interesting inquiries into the Respiration of Vegetables. But as we have already almost transgressed our limits, we shall content ourselves with a few such remarks on his researches in this department, as we hope will induce our readers to consult the work for themselves.

In the first place, then, Mr. Ellis seems to have abundantly established, both by numerous experiments of his own, and an appeal to those of preceding writers, that all terrestrial plants, whether growing in absolute darkness, in the shade, or exposed to the direct rays of the sun, are constantly removing a quantity of oxygen from the atmosphere, and substituting an exactly equal volume of carbonic acid:—that they produce this

change, by emitting from their leaves, flowers, fruits, stems and roots, by a process like animal exhalation, carbonaceous matter, which combines with the oxygen of the surrounding air; and that this function is essentially necessary to their vital existence.

But it is also shown, that the green parts, and the green parts alone, of these plants, when placed in the light, and particularly in the direct rays of the sun, while they are exhaling carbon to form carbonic acid with the surrounding oxygen, are also giving out a portion of pure oxygen;—that this oxygen seems to be derived from the decomposition of carbonic acid existing in the cellular texture of their green parts;—that this acid appears to be decomposed by the chemical agency of the solar light, which, penetrating into the cells containing it, resolves it into carbon and oxygen, whereof the former is retained, while the latter escapes through the external pores;—and, finally, that this process is not a constant and invariable function necessary to life, but an effect, in a manner additional, or subordinate; for a plant does not die when this formation of oxygen has ceased; and it may be found to occur in a dead plant as well as in one that is alive.

It was this production of oxygen by the green parts of plants exposed to light, or apparently depending on the decomposition of carbonic acid, which gave rise to the opinion, almost universally maintained since the time of Priestley, that by an admirable provision of nature, vegetables, in all circumstances, were continually employed in purifying the air, which had been deteriorated by the respiration of animals. But it is indeed scarcely possible, as our author has observed, that this opinion could have obtained such general regard, had not physiologists and chemists obviously satisfied themselves with contemplating, at a distance, the beauty of the Final Cause whose existence is implied, instead of carefully examining the facts by which it had been suggested. Mr. Ellis seems to have been the first to question their accuracy; and to show, that they were not only, even according to Priestley's own representation, imperfect and contradictory in themselves, but also in direct opposition to the experience of Priestley's cotemporary, the celebrated Scheele. We have pleasure in quoting the senti-

ments with which our author has closed his exposition of this very popular, and perhaps not unnatural error. They are written with that modesty and candour, which we wish to consider as virtues inseparable from minds truly intelligent; and we value them the more, that, in physiological discussions, they are comparatively rare in their occurrence.

‘ We have been drawn into these detailed remarks, not from any desire to depreciate Dr. Priestley’s labours, but from the circumstance of their having first given origin to the opinion, that plants, by their vegetation, at all times purify the air; and from a consideration of the importance which has ever since been attached to them. In the experimental sciences, it is chiefly by the successive detection of each other’s errors, that we gradually advance to truth; for rarely, indeed, does it happen, that human sagacity can at once foresee and appreciate all the possible circumstances in an experiment, which may influence and control its result. There is, therefore, no cause to wonder, that this illustrious philosopher did not discover those sources of fallacy, which the more advanced state of science has alone enabled his successors to point out. And the reflection, that our apparently more correct views may, at no distant day, undergo a similar revision, ought not only to teach us becoming diffidence in our own opinions, but may serve to check that rising triumph which little minds are sometimes apt to feel, when they see thus exposed the mistakes of superior men.’—§ 254.

Were the excellent remarks also contained in the following extract, limited in their reference merely to the subject under discussion, we should not probably have detained our readers by inserting them; but they are of much more extensive application. There is a class of scientific inquirers, of late years rather increasing in number, who seem disposed to measure the power of man by the extent of their own individual exertions; who would damp the noble ardour of philosophical pursuit, and check the progress of discovery, by throwing in our path every obstacle which their ingenuity can construct out of the crude and feeble materials of vital principles, and final causes, and ultimate facts; and who scarcely scruple to affirm, with a confidence which we are convinced their more enlarged expe-

rience will induce them to regard as unreasonable, that they have already attained the utmost boundary to which the human faculties can reach. Against such narrow views, our author's observations contain a just and eloquent appeal.

‘ But there have been writers,’ says he, ‘ who rested their views of the purification of the atmosphere by vegetation, not so much on observation and experiment, as on what they conceived to be its necessity in the general economy of Nature; and, with more, perhaps, of piety than of prudence, and certainly with a “ zeal not according to knowledge,” have represented the contrary doctrine as derogatory to the wisdom of Providence, and a calumny against Nature herself. It is indeed true, and it is among the most gratifying truths in the pursuit of science, that every real step which we make in the knowledge of nature, serves to illustrate the skill and wisdom with which all its parts are contrived to advance the general purposes of the whole; but of this whole it should also be recollected, that we, “ as yet, see but in part “ and as through a glass, darkly.” Hence imperfect and erroneous views of the order of nature may be often taken, and false conclusions may be grounded on them; and if these conclusions be afterwards announced as examples of divine wisdom, and be allowed to borrow the authority of final causes for their support, the history of science abundantly testifies that the vainest conceits of fallible man may, in time, come to be worshipped as the wisest institutions of unerring nature. It behoves us, therefore, to employ no ordinary portion of delicacy and caution in pronouncing on the general plans and purposes of Providence, from the little and partial views of nature, which, at present, we are permitted to take; lest, in the effervescence of our zeal, we degrade the wisdom we pretend to exalt, and prevent the designs of the goodness we profess to revere. With respect also to the charge of calumniating nature, he surely who, by assiduous observation of the facts which she offers to his contemplation, seeks to discover the laws of their connexion, and proposes his opinion of those laws as the simple result of his inquiries, may be regarded less as a calumniator, than he, who supplies the imperfection and deficiency in his facts, by the suggestions of imagination; and confidently

imposes upon Nature, laws and conditions, which she utterly disowns and disdains.' §§ 531, 532.

Since, then, it appears, that plants, as well as animals, are incessantly converting the pure part of the air into carbonic acid, and since it is also very generally known, that notwithstanding the vast extent of this deteriorating process, the atmosphere still maintains its uniformity of composition, at all times, and in all places; it is natural to ask, where are we to look for the means of its purification? To this most interesting and difficult question, our author thinks that, in the present state of our chemical knowledge, no satisfactory answer can be returned.

Lastly, Mr. Ellis, investigating the source of the oxygen emitted by the green parts of plants when exposed to light, has been led to one of the most beautiful theories, that have been suggested in modern physiology; That the various colours which adorn the vegetable kingdom, depend on the varied proportions of alkaline and acid matter mixed with the juices of the coloured parts of plants: That green and yellow, for example, are always produced by an excess of alkali, in the colorable juices of the leaf or flower—and all the shades of red by a predominance of acid; and that, in parts where neither acid nor alkali predominate, the colour is white: Just as, in an experiment familiar to every one, we convert an infusion of green leaves into red, by pouring into it a little vinegar—or an infusion of red flowers into green, by a few drops of potass or ammonia—or destroy the colours of both infusions entirely, by adding the alkali and acid in such proportions, as that they shall exactly neutralize each other. But it is well known, that the presence of light is essentially necessary to the production of colours, in various plants. Thus, if a plant, which is naturally of a green colour, be made to grow in total darkness, the leaves and other parts, as they unfold themselves, will appear perfectly white, and remain so. But if we now bring this *etiolated* plant, as it is called, into the light, the blanched foliage, and the young leaves, as they expand from the buds, will soon acquire a yellowish tint, which will gradually deepen into a green; and this colour, after being completely formed, may again be made to disappear by returning the plant into a dark place.

The etiolation, or blanching of the roots of celery, and of the inner parts of cabbages and lettuces, are familiar examples of the same kind. In like manner, if red rose trees are carefully secluded from the light, they will produce flowers almost white; or if a portion of a ripening peach or cherry be covered with a piece of tinfoil, the uncovered parts of the surface will become perfectly red, while the covered portion will exhibit only a pale, or straw-colour.

Now, in all these instances, our author has suggested, that the light contributes to the development of the colour, merely by modifying the portions of alkali or acid matter in the fluids of the part. For it is found, that the blanched leaves of an etiolated plant abound in carbonic acid, and that they not only contain less alkali than green leaves, but that this alkali exists in a more neutralized state: and hence, according to Mr. Ellis, their white colour. But as soon as the plant is brought into the sun, the chemical action of the solar beam begins, as it would seem, to decompose the carbonic acid existing in the white parts; the alkali by degrees comes to predominate; and the colour of the leaves is observed to pass gradually into a full green. Thus, too, a reason may be assigned, why the green parts alone of plants placed in the light have been said to afford oxygen: for, in fact, the emission of oxygen, and the production of the green colour, appear both to depend on the same cause—the decomposition of carbonic acid; so that we cannot so properly affirm that the green parts afford oxygen, as that they become green when that gas is expelled. Again, when, in the fall of the year, vegetation begins to decline, alkaline matter seems less abundantly supplied; while spontaneous decomposition appears actually to increase the quantity of acid in the leaves: and, according to the various proportions of acid which are developed in the leaves of different plants, the foliage exhibits those various shades of brown, or those bright tints of yellow and red, which so beautifully diversify an autumnal scene. On the other hand, it would seem, that, when the sunbeams either entirely produce, or only heighten the red colours of flowers or fruits, they produce these effects by some chemical action, which favours the formation of acid in the juices of the coloured part.

These very novel and ingenious views, so consonant with the usual simplicity of Nature's operations, are unfolded at great length by our author, in two sections, which will probably appear the most generally interesting in his Inquiry. They are accompanied, also, with an able disquisition on the causes of colour in bodies in general; and on the analogy, in chemical operations, between the two kinds of electricity and the two species of invisible rays in the solar beam—the chemical and calorific. Of the former, we have only to remark, that Mr. Ellis has both appreciated with judgment, and contributed to confirm, the valuable though much neglected views of Delaval and Bancroft. With respect to the latter, we can scarcely venture to grant to our author, that the analogy in question exists to the extent to which he has endeavoured to trace it. We do not, however, withhold our assent, from conceiving that there is any defect in the reasoning which Mr. Ellis has employed—for, indeed, if the *data* he has assumed be granted, we believe the conclusions he has deduced from them are altogether unobjectionable—but because we strongly suspect that most of the observations on the operation of galvanism in chemical decompositions, which have lately been offered to the public under the specious names of 'general laws,' and 'statements of fact,' are blended with hypothesis to no inconsiderable extent.

Our author does not seem to have made any observations on the respiration of aquatic plants: but we may presume that, like aquatic animals, they possess the power of producing changes on the air combined with the water in which they grow, similar to those which terrestrial vegetables effect on the air of the atmosphere.

From all these views, therefore, we are fully disposed to conclude, that the author of the volumes before us has satisfactorily established this important general truth in philosophy,—That the change which all animals and vegetables are continually producing on the atmosphere, or on the air of the fluids in which they live, consits simply in the conversion of a portion of oxygen into an equal bulk of carbonic acid, by the addition of carbon exhaled from the living organized body.

And now the question will naturally again suggest itself, why is this exhalation of carbon, and conversion of oxygen

into carbonic acid, essentially necessary to the occurrence of that assemblage of phenomena which we express by the term Life?

It is pretty bold, we think, in any physiologist to undertake to answer such a question as this; and indeed it is plain enough, that any answer which human genius can give to it, can only remove our insurmountable ignorance one degree further back, and merely reduce, under a more comprehensive denomination, all the miscellaneous phenomena which indicate the inexplicable combination of organized matter with sensation and perception. This, indeed, is all that Mr. Ellis probably proposes to attempt in the succeeding part of his publication, as we observe that he only announces his expectation of being able to trace all the effects which are observed to depend on respiration in animals and plants, to the agency of that subtile or calorific matter which is universally liberated on the conversion of oxygen into carbonic acid, and which enters into the animal and vegetable systems. It is impossible not to anticipate the explanation which such a view will at once afford of many puzzling and obscure phenomena: we need only allude to two, the change of colour, from modena to scarlet, which the blood undergoes in the lungs of a full grown person; and the corresponding change which the blood of the child suffers, in the placenta, within the mother's womb. In both instances, Mr. Ellis, we presume, will say, *caloric*, and not the absorption of any gas, is the agent which operates the change.

Of Mr. Ellis's style, we have nothing to observe but in commendation. It is pure and perspicuous throughout. We think, however, that the arrangement of his work is susceptible of improvement. The order which we have followed, in exhibiting a general view of the subjects it embraces, is nearly the reverse of that in which they are treated in the Inquiry itself. The author seems to have adopted, as the foundation of his arrangement, a principle almost generally admitted, it is true, in physiological writings, but admitted, we apprehend, on very insufficient proof; namely, that zoophytes and vegetables, or the lower classes, as they are called, of organized bodies, are the most *simple* in their structure; and, therefore, that in the investigation of any general function in the economy of living

beings, we ought to rise gradually, from the contemplation of the more simple properties which, it is presumed, bodies simple in their structure possess, to the study of the complicated phenomena, accompanying a more complex organization. To this, however, we would reply, that in man the phenomena of life are exhibited on the grandest scale, and in circumstances the most favourable to accurate observation, and that with the human body, therefore, the properties of every other form of organized existence ought to be compared; that if the structure of the lowest classes appears more simple, it is only because it is more minute; and that, in truth, none of them are totally devoid of any of those properties which seem essential to life in the higher classes—although our senses, even when aided by the most powerful instruments, have not yet been able to perceive the individual parts by which these properties are exercised. M. Trembley has described, in one of the most interesting and best written memoirs in natural history, three kinds of fresh water polypes, which consist merely of a cylindrical tube or pouch, open at both ends, formed of an extremely thin, transparent skin, in which not the slightest appearance of nerves, or muscular fibres, or vessels, can be seen; animals which can be cut into slices almost in every direction, and each slice becomes a perfect polype; nay, what is even more extraordinary, which may be turned outside in, and still continue to live as well as before. Yet these singular beings exhibit the most unequivocal indications of volition in their various motions from place to place, either to expose themselves to the pleasing influence of light, or in search of insects often larger than themselves, which they dexterously entangle in their arms, convey to their mouth, and devour with the utmost voracity. Voluntary motions, like these, we conceive dependent only on the previous consciousness of sensations and ideas. The apparently insignificant creatures which exhibit them have obviously the same motives to action as ourselves—the love of pleasure, and the fear of pain. But sensation, ideas, and volition, are phenomena which uniform experience has taught us, are inseparable from a nervous system; the conclusion, therefore, with respect to the polype, cannot but be obvious. In man, these phenomena are exhibited by parts so large, as to be observed and distinguished with ac-

curacy, both in form and composition; in the polype, the corresponding organs are so minute, that they are wholly imperceptible to the quickest eye. And if this inference be just, can it reasonably be maintained, that *simplicity* of structure is the most distinguishing character of these lower animals? For our own parts, so strongly are we impressed with an opposite opinion, that when we compare these two extremes of organization, and reflect on the much greater difficulty which attends the construction of every thing that is minute in the works of art, we hesitate which to regard as the more wonderful production of Incomprehensible Power—the obscure and diminutive Polype—or Man, the lord of the creation.

Einleitung in die Augenheilkunde, von DR. KARL HIMLY, ordentlichem öffentlichen Lehrer der Medizin zu Göttingen, &c.
8vo. S. 104. Jena. Imported by Boosey, London.

[From the London Medical Review, for October 1811.]

THIS small volume contains the substance of three tracts on diseases of the eye, first published in the *Ophthalmologische Bibliothek*, a work conducted by Himly and Schmidt of Vienna; both well known in Germany, as lecturers on medicine, and as the authors of several ingenious papers on the physiology and diseases of the eye. With the latter subject Himly appears to be well acquainted. He has seen and practised much, and writes with the ease and confidence of a person who has been often an eye-witness of what he describes. His practical remarks however, are occasionally interrupted by a little physiology, not of the most intelligible kind, especially to those who are unaccustomed to the phraseology of the German schools. The first paper contains a short review of the present state of medical science on the continent, as far as relates to the treatment of the disorders of the eye. Himly sets out with deploring the evils which have arisen from the trifling attention paid to the subject by the generality of medical men. The consequences have been, that but few possess accurate and well grounded knowledge of the subject; and that from the neglect

of the many, occasion has been given to ignorant pretenders of taking this branch of medicine to themselves. Their endeavours have afterwards been directed to secure it; and from an acquired dexterity in performing some few operations, they now lay claim to the exclusive care of every disorder of the eye.

The time has been when these observations might have been applied to the state of the medical profession of this country; but the case is now different, and the subject appears at present to command unusual attention. We have been already presented with some valuable publications; we are led to expect more; and we have seen established within a very few years, infirmaries designed exclusively for the care of diseases of the eye. In the hands of liberal and able men such institutions must have the best possible effect. They will provide the surest means of obtaining a more accurate knowledge of the diseases of this delicate organ, by affording an extent of observation which no sphere of general practice could possibly accumulate. We are sorry however, to observe, that of the two establishments in this metropolis, one only fulfils this great object of its existence, by exposing its fields of observation to the profession in general. The practice of the other is carefully confined to the operator and his single assistant. By some fortuitous circumstance, or through very particular interest, a student may perhaps obtain the useless favour of witnessing a solitary operation; but the infinitely more important part, the medical and surgical treatment of the varieties of disease which must daily occur at this public charity, is kept wholly to themselves.

Much advantage has certainly arisen to medicine from the attention of an individual being directed to some particular object of the art, to some natural class of diseases, or to the diseases of some one organ. But if the result of the knowledge thus obtained is to be possessed only by the individual, or by a chosen few, it will be allowed that the knowledge has been gained for little useful purpose. It is reasonable to expect great advantages from institutions like those above referred to, where the diseases of a particular organ are seen on the broadest possible scale, and where every facility is

afforded of bringing the varieties of operations, and the actions of different remedies to the test of comparative experience. But how can we expect these advantages where a public institution is made an object of private interest, and the world is deprived of those benefits which would result from more diffused experience and observation. While on this subject we may be allowed to add, that we cannot see in what way the public is benefited by confiding the treatment of diseases of the eye to the exclusive care of a few individuals. Granting that a dexterity in operating upon this delicate organ is to be acquired by an observance of minutiae which extensive practice alone can bestow, we would remark that the diseases of the eye which require operations are comparatively few; and we think we have more than once observed, that this acquired dexterity was by no means adequately supported by an accurate and extensive knowledge of disease; but where, on the contrary, it appeared to be always uppermost in the mind of its possessor, whom it diverted from proper attention to more humble, but equally useful objects.

Besides if a dexterity sufficient to secure the object of the operation is only to be acquired by a few and by repeated practice, it will be at once evident that of necessity the majority will be excluded from reaping any benefit from it. The fact is, that an accurate acquaintance with the anatomy of the parts, and a thorough knowledge of the principles on which the different operations are performed will secure to their possessor the same success as they always do in performing operations on other parts of the body. The difference is not so essential, or the difficulties so great, as to prevent any intelligent and well educated surgeon from practising this as successfully as any other part of his profession; and experience has fully proved that the advancement of this department of surgery has been owing, not to the genius of the few who have exclusively devoted themselves to the subject, but to those who have combined a more extensive insight into the powers of the system in general, and whose comparative knowledge of disease has deduced the most effectual means of relief. We might illustrate this from the labours of Pott, of Richter, of Scarpa and of Hey, whose improvements in the operative

treatment of diseases of the eye are not more conspicuous than in various other branches of the profession. In truth it is probable that the distinction will at no distant period be done away, and the treatment of disorders of the eyes be confided to the same men to whom we trust the care of other important organs. The only plea for separating them is founded on the nicety and skill requisite to perform operations, and in the present advanced state of anatomical knowledge and surgical skill, we think the necessity will not be found to exist.

In the second part we find a very full detail of the plan to be followed in examining a disordered eye. It contains some useful observations; nor will his directions appear unnecessarily minute, to any one acquainted by practice with the difficulties which often occur in gaining a sufficient insight into the nature and condition of the disease. It is not every complaint of the eye which requires so full an examination as is here recommended; but we should recollect, that a careless or incomplete examination is, in many cases, full of evil consequences. And where there exists no marked organic mischief, we gain no little knowledge when we ascertain the general condition and constitution of the eye, which is more particularly open to any one species of disordered function.

Our attention is first directed to the position of the patient and the light. It will be sufficient to remember that the best light only dazzles when reflected unfavourably, and that the examiner often causes this faulty reflection by the unfavourable position in which he places his patient, or by teasing the eye till it is full of tears. "The best way is to hold a moveable object before the patient's eye, which is to be fixed on it; the object is then to be moved in every direction until the examiner sees clearly into the eye, and there to be kept until he is satisfied." "It is often useful to throw a stronger light on the eye by a concave speculum, or to examine it through a convex lens."

In cases of acute disease when the eye is irritable, and the orbicularis acts strongly on the admission of light, the eye is to be shaded, and the patient invited to open the lids, as every attempt to force them asunder only increases the action of the muscle, and causes its eversion. In such cases the simplest

mode, and one which insures a complete view of the eye without any injury, is to elevate the upper lid by passing a thin Pellier's speculum underneath it. It appears certainly at first more alarming than opening the lids by the fingers, but in fact it causes less pain and infinitely less disturbance.

Another obstacle to the complete examination of an eye is the iris, the pupil closing in proportion as we admit light; and as the iris is in front of many important parts, it often impedes an accurate knowledge of their condition. To obviate this, Himly employs a solution of the extract of hyoscyamus in water, which he drops into the eye; or he applies a plaster of hyoscyamus near the eye, which causes a complete dilatation of the pupil; the effect continues five or six hours. We have generally seen the extract of belladonna employed for this purpose; a small portion being placed either between the eyelids, or a larger quantity rubbed upon the eye-brows and temples. Being a foreign substance on the conjunctiva it causes some redness and watering, and does not appear to be more efficacious than when applied upon the eye-brows. The pupil is sometimes thrown so widely open as to afford a view of the anterior edge of the ciliary processes in front of the edge of an opaque lens. The motion of the iris is never eventually injured by this application even when used for a considerable time, and it affords the only effectual mode of examining those early changes of the retina which attend the formation of that disease which has been termed fungus hæmatodes in the eye. In these cases the pupil is at first so much contracted, that a very small portion of the retina can be perceived, but by the application of the belladonna, the whole extent and the appearances of the disease may be ascertained. The power of this application on the iris does not appear to be at all influenced by the state of the retina, since it produces exactly the same effect in the most obstinate cases of gutta serena. Its effects upon the retina are the same as those of narcotics in general, namely, dulness of sight, strabismus, &c. and its action on the iris is equally certain when taken into the stomach as when applied locally. From this property of exciting contraction in the iris it is an agent of great surgical importance, in preventing adhesions which so frequently succeed inflammation between the

iris and inner surface of the cornea, in obviating that slow inflammation of the iris which causes obliteration of the pupil after the extraction of the cataract, and also in preventing those adhesions and contractions which have frustrated the success of most operations for artificial pupil.

We are next directed to observe the general situation of the eye in the orbit, and the appearances of the lids. The diseases of the latter and the points to which our attention should be directed in examining them are briefly touched on, but in a manner which at once bespeaks a perfect familiarity in the author with all the various forms in which they appear.

As a favourable and at the same time useful specimen of the manner in which the subject is treated we have taken the remarks of our author on ascertaining diseased appearances in the eye:—

“18. Observe the size of the eye-ball, its motion, and the direction of one as compared with that of the other; also its softness, or tension.

“19. Conjunctiva. Observe its connexion with the parts below, if tight, or loose. The number of red vessels in it, and the colour of the blood they carry, bearing in mind that often the eye becomes bloodshot while you are inspecting it, when it was nearly bloodless when you began. Mark if these vessels are in the conjunctiva or sclerotica; if running in straight lines with numerous intersections, or in convoluted or tortuous courses. If any pustules, ulcers, &c.

“20. Cornea. Examine it in front and sideways; its convexity, clearness, and polish: if any zone of vessels round its connexion with the sclerotica: if any red vessels crossing it; if running into its substance, or over its surface.

“21. Sclerotica. If any unequal surface, any bulging, or pits: any spots of a dark blue appearance, and semitransparent: any ulcer, or fungus, &c. any deposit between it and the conjunctiva. The vessels of the sclerotica may be distinguished from those of the conjunctiva by their straighter course, and their more fixed situation.

“22. Iris. Its colour; if any distinct red vessels, or any redness, the consequence of acute or chronic inflammation; particularly at its innermost circle, which is more frequently made

unnaturally vascular and reddened by such causes. This redness is often discoverable by a large reflected red tinge on the cornea when viewed sideways, which tinge disappears if the iris is made to form only a narrow ring by the action of the hyoscyamus. If its colour is dull: the pale gray appearance is often observable after acute inflammation of the iris. The colour of the iris is often changed by the faulty colour of the aqueous humour; for instance, after extravasations of blood, or pus into the anterior chamber. The colour of the iris differs sometimes in the two eyes: in other instances it is particoloured. Observe also the colour of the iris as connected with any particular class of diseases.

“23. Pupil. Its size, shape, regularity of margin; if it lies even, bulges, or is drawn back, or to either side.

“24. The texture of the iris. If thin, or thicker than natural; if uniform in structure, or showing a kind of net-work, made by projections and surrounding spots.

“25. Further observe the general position of the iris: if flat, concave, or convex. The latter betokens generally some disease of parts behind: its concavity often follows the absorption, or dislocation of the lens. Its natural situation, however, varies considerably in different individuals. It is always more convex in young children. Observe also if it swings backwards and forwards on moving the head or eye.

“26. The motion of the iris. If the contraction and dilatation of the pupil be in proportion to the admission and exclusion of light. If it moves quickly or sluggishly. If it fixes steadily and at once, or oscillates after having been put in motion. If more movable in one eye than in the other. In some cases the natural motion of the pupil is reversed, dilating in proportion as the light is admitted. This fact (for I have witnessed it in a case where the patient was almost blind) arises, I think, from too great a sensibility of the retina, which becomes paralyzed on the admission of light, the pupil being contracted to the utmost when the eye is shut, or the place made nearly dark. Observe also if the pupil dilates equally, or if any part hitches. Even where the pupil remains unaltered in all changes of light, we are not hastily to conclude that no action takes place in the iris. The pupillar edge may be adhe-

rent to the capsule of the lens, and by close inspection we may still discover some motion in its fibres, or some change in its position.

• “28. The anterior chamber. Be careful not to mistake a cloudiness and thickening of the cornea for a turbidness of the aqueous humour. Collections of puriform fluid in the anterior chamber are not at all uncommon, but must be distinguished from the milky cloudiness of the cornea observable so often in inflammations. Collections of matter are always at the lower part of the chamber, and generally vary their position if the patient lie down on one side. The aqueous humour often appears reddish by reflection from the iris or cornea.

“29. The bottom of the eye. Observe its colour, and the transparency of the parts behind the pupil. The darkness of the pupil often depends on the position of the patient, the degree of light, and the width of the opening. We are sometimes deceived by reflections from opacities at the edge of the cornea, which throw a grayish shade on the opening. The pupil not appearing of a clear black has been set down as the mark of some unsoundness behind, when it only depended on the circumstances attending the examination. Thus the pupil often appears gray and smoky in sound eyes with perfect vision. When the pupil is really cloudy from disease, distinguish if the cause lies in the lens or its capsule, in the vitreous humour, or in the retina. Does the paleness of colour so often seen in amaurosis proceed from an opaque retina, or a deficiency of pigmentum?

“34. Vision. Is sight lost or only defective? Do objects appear too large or too small? Are they doubled, or only half seen? Do objects at rest appear in motion? Is there any appearance of the rainbow colours round the object; and if so, is it constant, or only under particular circumstances? Is the object seen plainly at first, and does the sight fail only after continued inspection: or the reverse, does the object become clearer by intently viewing it? Is the duration of perfect vision short? How is the sight at different times of the day? Is it better in a bright or dull light, when the eye or back is opposite to the light? At what distance is vision most distinct? Is the distinct vision of small objects confined to a small space? Are colours

accurately distinguished, or are they mistaken one for another; and if so, are the colours changed to lighter, or darker? In all your inquiries compare the powers of one eye with those of the other."

These are only a small part of Himly's directions: his inquiries are extended much further, and to many other points. Enough however, has been given to show the spirit in which they are written, the end at which he aims. We wish that a recollection of them may be of use to any of our readers, by reminding them of the necessity, which really exists, of minute investigation and attention to every appearance, in the investigation of the diseases of this organ. The eye, of all organs, is not the one to bear without injury the indiscriminate application of active remedies, now so generally employed. The just dread of doing injury has in some instances given rise to a feebleness of practice, which allows the disease to proceed till its advance can no longer be arrested. In the opposite extreme an end is put to the eye and to the disease by the untimely or improper interference of too active means. The evil in both cases arises not so much from ignorance of the different remedies as from the want of knowing the exact nature of the diseased appearances, and the powers and actions of the different structures which are engaged in them.

The third tract contains some remarks on the best means and forms of applying medicines to the eye; and on the remedies best adapted to its diseases. We do not see any thing of importance in it, which we can suppose not to be known to the generality of our readers. Only let it be remembered that whatever remedies are recommended should be carried into effect with as much gentleness as the case will allow. Much harm is often done by coarse remedies, and by rough manipulations in the application of those which are excellent in themselves: so much indeed, as utterly to do away any good which might otherwise be expected. Excepting in cases where the disease is manifest, we should never slur, or give up the examination of a diseased eye from the fear of giving temporary pain. But it is of such very great consequence whether this be done by a clumsy, or by a light and agile hand, that we cannot too strongly inculcate the necessity of acting with delicacy.

This applies still more forcibly to the mode in which we administer our remedies: success depends essentially on the form and manner of their employment.

A Treatise on some Practical Points relating to the Diseases of the Eye, by the late JOHN CUNNINGHAM SAUNDERS, Demonstrator of Anatomy at St. Thomas's Hospital, Founder and Surgeon of the London Infirmary for curing Diseases of the Eye. To which is added, A short Account of the Author's Life, and his Method of Curing the Congenital Cataract, by his Friend and Colleague, J. R. FARRE, M. D. The whole illustrated by coloured Engravings. London, 1811, large 8vo. pp. 216.

[From the New Medical and Physical Journal, for April 1812.]

THE name of Saunders must be familiar to most of our readers, for there are few, we presume, who are unacquainted with the Establishment of the Institution in the metropolis for curing Diseases of the Eye, which owed its origin to his recommendation and exertions. The numerous cures performed by him while he held the situation of surgeon to that charity, were honourable proofs of his surgical skill and attentive diligence in the exercise of his profession. That his labours were at so early a period terminated by the hand of death, is a subject of regret equally to his friends, and to those who anticipated the further improvement of that interesting branch of surgical practice to which he exclusively directed his attention, and on which he employed all his abilities, certainly of no inferior order. It is a satisfaction, however, to know, that there still remain some fruits of his labours, and that the papers he left were capable of being arranged and given to the public by his friend and colleague, who, from the intimacy which had long subsisted between them, and from their having laboured together on the same object, is well able to add to what the author has written, a further account of what he had done.

The short life prefixed to the work contains, as might be expected, few events of much importance or striking interest. The uniform life of a professional man furnishes few materials

for animated description or contemplative reflection; his character is rather to be estimated by the diligence he manifests in the discharge of his professional duties, and by the value of his professional writings. After a classical education, Mr. Saunders was apprenticed in 1790 to a surgeon at Barnstaple, in his native county; from thence he removed at the usual period to complete his studies in the metropolis. At the end of two years, he was appointed Demonstrator of Anatomy at St. Thomas's Hospital, a situation he held, with a very short intermission, till the winter in which he died. The establishment of the infirmary for curing diseases of the eye, in 1804, afforded him an extensive opportunity of treating all the various diseases of this important organ. His attention was particularly directed to, and he was in the habit of practising a successful operation on the congenital cataract, and he appears to have been the first surgeon who had given this disease a distinct consideration, or had viewed it in any other light than as an occasional variety of the disease, which was to be treated precisely by the same means as the cataract of the adult. These means, however, are inapplicable to the condition of infancy, and therefore, the child thus affected, has been consigned to blindness for at least the first eight years of its existence, as a less evil than the hazard of an operation at so tender an age. It is obvious, that a person, circumstanced as was the late Mr. Saunders, with extensive opportunities and adequate abilities, would have it in his power to communicate much valuable information to his brethren of the profession; and the work now produced, while it has been anticipated with much expectation, will be received with great satisfaction, and read with no little advantage. Those parts of the volume necessarily supplied by the Editor, on account of the unfinished state in which the author left his papers, will be found to contain many useful practical observations, obtained from the same source, and during the joint labours of the two colleagues and friends. That this publication had been long in the contemplation of the author, but unavoidably delayed, is evident by the following extract from the Editor's account of his life.

“In the beginning of 1809, Mr. Saunders announced by advertisement, in the Medical Journals, his intention of pub-

lishing a Treatise on some practical points relating to the Diseases of the Eye, and particularly on the nature and cure of cataract in persons born blind. He was so completely occupied with public and private professional duties, that only a small portion of his time, during the summer months, could be devoted to the labours of an author: yet, when it is considered, that not quite five years had elapsed from the establishment of the Infirmary, before his valuable life was closed, it must be admitted, that he was not inattentive to that service, as he had published, during this period, a work on the Anatomy and Diseases of the Ear, and an essay on Inflammation of the Iris, as a specimen of a series which he meant to communicate on the diseases of the eye. In the course of this year, his inquiries on the congenital cataract were nearly concluded; and after the anatomical lectures had closed, he commenced the manuscript of his intended publication. He wrote the Essay on Inflammation of the Conjunctiva in Infants, and on the Cure of the Inversion of the Upper Eye-lid by excision of the Tarsus, which, together with the Essay on Inflammation of the Iris, form the three first chapters of the following work; but he was not enabled even to correct what he had written. The attacks of the disease which proved fatal to him, were now so frequent, the pain of his head so excruciating, that in his intervals of ease, he was so much deprived of the usual energy of mind which had been natural to him, that although he struggled to redeem his pledge, he was unable to accomplish his intention. The editor cannot overlook his notes of cases, taken at this time in a tremulous and sometimes illegible handwriting, without the most painful recollection of his sufferings. But even in this state, he could not be prevailed on, to quit the scene of his hitherto active labours for temporary repose in the country."

For the perusal of those who did not personally know the late Mr. Saunders, we subjoin the following very short but just description of his person and character. "Mr. Saunders was of the middle size, well made, and of an engaging mien. His mind was active, but its original bias was not in favour of the medical profession. Warm in his temper, naturally brave, and enthusiastically fond of whatever was truly British; his wish was to have distinguished himself in the service of his country.

But although he was not led by choice to cultivate surgery, from the moment that he engaged in it, he pursued that line of study which most surely led to professional distinction. He was generous in his private practice, and perfectly unreserved in stating his opinions on the cases submitted to his judgment. In his public practice, he truly deserved the title of a benefactor, for he never would accept any remuneration for his services, although a very liberal one was offered to him by the General Committee of the Infirmary."

The first chapter treats of the purulent ophthalmia of infants, which the author considers to be an erysipelatous inflammation of the conjunctiva. This opinion is founded, not on any precise resemblance of the general appearances or symptoms of this affection with erysipelas of the skin, but on the circumstance of their coinciding in one essential particular, the production of sloughs. That the nature of inflammation is greatly varied, according to the structure of the different parts it attacks, is now generally admitted. In the first attack of the disease under consideration, there is a copious discharge of purulent mucus, similar to what takes place when the mucous membrane of other parts of the body becomes inflamed, as in catarrh and gonorrhœa; how far any advantage is derived from classing differently a disease which so closely resembles the active inflammation of other membranous surfaces in its attack, and which requires for its removal a similar treatment, may be justly questioned. The production of sloughs seems to us rather the effect of the *extension* of the inflammation to a part of different structure, (the cornea) from the mucous membrane first attacked, than characteristic of the *nature* of the primary disease of the conjunctiva. However this may be, the author's description of the appearances and progress of the disease is so accurate, as may be expected from his extensive opportunities of observing it, that we shall give it to our readers in his own words.

"The inflammation commences by a slight redness on the inside of the eyelids, particularly about the inner canthi; they are soon covered with a thin gluey matter, which quickly inspissating, fastens them together, and when they are forcibly opened, a large gush of tears succeeds. The eye-lids tumify

very soon; the viscid discharge increases in quantity, and speedily assumes a purulent form, whilst the tumefaction of the palpebræ increases. The conjunctiva now loses its character, its vascularity becomes extreme, and the minute colourless vessels which nourish its own peculiar texture, are so enlarged and turgid with arterial blood, that the larger branches which run beneath it are totally obscured.

The surface of the conjunctiva is of a beautiful scarlet, and resembles (to use an anatomical illustration) a finely injected fœtal stomach. The swelling of the palpebræ is so great, that when the child cries, the orbicularis muscle projects the morbid conjunctiva, and consequently everts the eye-lids; ejecting at the same time, a considerable quantity of the puriform discharge. As the disease advances, the cornea becomes more or less cloudy, and by the extent of this cloudiness, the degree of approaching slough is marked; for the whole of the cornea, if the whole become cloudy, will ultimately slough, and the form of the eye be totally destroyed. I do not mean to say, that in every instance in which opacity of the cornea is apparent, the cornea is about to pass into a sloughy state; on the contrary, opacity is often the mark of a healthy action commencing around the breach of the cornea, for the purpose of restoring the part, and ought to be hailed as a happy omen. I am now speaking of a peculiar duskiness of the cornea, which begins during the progressive state of the inflammation, which is antecedent to any loss of substance, but is indeed a sure sign that such loss is about to take place. When this duskiness comes on, supposing only a portion of the cornea about to slough, the extent of it in the space of twenty-four hours becomes definite; in the same space of time, it becomes elevated, and apparently lessened in extent; a groove or fissure forms between it and the rest of the cornea; portions of it are carried off by the discharge and tears, or sometimes it separates altogether in one mass. I have several times washed out with a syringe these little sloughs entire.

“But although I am as certain of the fact as the most frequent observation can make me, I am equally sure, that most commonly, when this disease destroys vision, the destruction is accomplished in a more gradual manner, not by a slough of

very considerable extent, and through the whole depth of the cornea at once, but by a succession of sloughs. In other words, the ulcer left by the casting off of the dead piece of cornea, becomes in turn sloughy, and extends itself by a succession of sloughy surfaces, until the last lamina of the cornea sloughs, or being protruded by the pressure from within, ulcerates, and the aqueous humours escaping, the iris passes through the breach of the cornea. Already the whole surface of the eye has been in an ill-conditioned inflammation; the ulcer, or rather the surface of the cornea around the protruding iris, is indisposed to heal; so that more and more of the iris protrudes: this in turn ulcerates, and the crystalline and vitreous humours all issue at the orifice.

“This is the most violent state of the disease, and is less frequent than a more moderate, but still malignant form, in which opacities or small specks are produced by the ulcerative process on some parts of the cornea.”

The method of treatment recommended by the author, corresponds with his opinion of the nature of the disease. He objects to the indiscriminate use of stimulant injections; a strict antiphlogistic plan is to be adopted in the commencement of the inflammation; a sufficient number of leeches should be applied as near the eye as possible, so as to produce the effect of general as well as local bleeding. “In the space of twenty-four hours, the danger will be considerably diminished, and the antiphlogistic plan being a little longer continued, the activity of the disease will be subdued; then, by the use of mild astringents, the discharge will gradually cease in the course of a fortnight or three weeks, and the eye will be left free from the most trifling defect.”

If, during the continuance of the active inflammation, the cornea grows dusky, the danger is great; it is the unerring harbinger of approaching mortification of the part; yet the mortification may proceed to some extent, and the sloughy part of the cornea be of some depth, without the eye being absolutely lost; if the sloughy part be small, it will only be a case of proclidentia iridis, and the major part of which cases, the author shows to be very tractable. The purulent discharge itself is not mischievous to the eye, it is to be considered only

as one of the symptoms of the inflammation, which will subside when the primary disease is removed; but the author allows, that on the decline of the inflammation, the conjunctiva is sooner restored from the ill-conditioned state which protracts the discharge, by the use of astringent injections.

The inflammation of the iris is a very formidable disease, since even when the inflammation does not proceed so far as to affect the other tunics, and cause the eye to be destroyed by suppuration, it is frequently followed by an obliteration of the pupil, or an adhesion of the iris to the capsule of the crystalline lens, leaving only a very minute aperture, which is most commonly occupied by an opaque portion of the capsule, or of organized lymph, and the patient is totally blind. On the first attack of the disease, the iris loses its brilliancy of colour, it becomes thickened and puckered, the inner margin is turned towards the crystalline lens, and the pupil is exceedingly contracted. The most active treatment is requisite in the early stages of this complaint, to arrest its progress and prevent its terminating in a permanent adhesion between the iris and capsule of the lens. The application of leeches, mild laxatives, and a simple regimen, the ordinary practice in a common ophthalmia, will be inadequate. In a healthy person, labouring only under this local disease, blood-letting, in a degree sufficient to reduce the pulse very considerably, most active cathartics, and deprivation of solid food, will be barely sufficient to stop its progress. The chief object is to impair the force of the heart, and nothing will more completely accomplish this intention, than the abstraction of blood. After general bleeding has been pushed as far as is prudent, leeches may be applied, and will be found an useful auxiliary. When lymph is deposited between the iris and capsule, it becomes organized, and unites them. The indication, in the management of this state of deposited lymph, is, to effect as much as possible, the dilatation of the pupil, that when the iris shall be fixed to the capsule of the lens, as it certainly will be by the adhesive inflammation, there shall remain a sufficient aperture to transmit light to the bottom of the eye. This purpose will be completely effected by the extract of belladonna, which possesses a remarkable power of dilating the pupil, as is evinced even in cases of

the utmost dilatation attending perfect insensibility of the retina; for, by this substance, a still greater dilatation has been produced. We subjoin the author's account of the *modus operandi* of this remedy, and a case illustrative of his method of treatment in inflamed iris.

"Now this substance, (*belladonna*) if properly applied to the eye during the adhesive process of inflammation, will cause the inner margin of the iris to expand and recede from the axis of the pupil, and will thus overcome the restraint arising from the agglutination of lymph, by elongating the organized bands which connect the iris and capsule, if they have not been of long duration. Thus the adhesions are drawn out to a degree of tenuity, and consequently transparency, and a considerable quantity of light is admitted. If the effect of the inflammation has been slight, the adhesions will be trivial, and the pupil only slightly irregular. The iris will retain a certain power of action, and vision will be very little injured. In general the pupil is misshapen, and the iris perfectly fixed; but if the aperture be of sufficient size, and the capsule not rendered too opake, the patient will enjoy a very useful degree of sight. The reader will observe, that in this communication I have been speaking of inflammation of the iris, as of a disease which I have often seen uncombined with any superficial ophthalmia. It must, however, be granted, that generally an inflammation of the conjunctiva, in a greater or less degree, is associated with it; but unless there be deep ulcerations, or sloughing of the cornea, the treatment of the case will not materially vary.

"January 23d, 1806, Mary Skinner, a woman of a plethoric habit, applied at the dispensary, labouring under acute inflammation of the eye. The pupil was contracted, and rendered opake by a deposition of lymph. She was blind on her admission. The temporal artery was divided, and she was otherwise treated on an active antiphlogistic plan.

"On the 31st, The inflammation had subsided, the pupil was a little clearer, and she could distinguish large objects.

"February 5th, The pupil was still contracted as at first. I now applied *belladonna*: in the course of two days, the pupil was considerably enlarged and oval; and by the exhibition of proper remedies, the lymph occupying the aperture was nearly

absorbed. The iris, however, remains fixed by adhesions, and the pupil does not vary. Her sight is very good."

The author's attention is next directed to an affection which is always distressing to the patient and disagreeable to the beholder; the inversion of the upper eye-lid. Fortunately, the remedy for it is simple and efficacious. This disease is sometimes produced by burns or wounds, but the most frequent cause of it is inflammation. The principal use of the tarsus, according to the author, is to sustain the roots of the cilia on the exterior surface of its ciliary margin, which maintains a given position, and thus enables the hairs to lie in that direction which was intended by nature. It is evident, that the cilia could not sustain themselves on the margin of a flexible substance, acted on by strong muscular fibres; the contraction of the orbicularis would perpetually invert them. The existence of cilia, therefore, necessarily calls for the existence of the tarsus. The insertion of the levator palpebræ is stated to be, (contrary to the opinion of former anatomists, with the exception of Dr. Crampton) into the integuments and conjunctiva. From this circumstance, the author was induced to suppose, that if the tarsus were removed without the destruction of the muscular fibres, these preserving almost entirely their former attachments, no particular shortening of the eye-lid would arise from it; and this actually turns out to be the case; and the deformity produced by the operation is not considerable, when compared with the previous state of disease. The mode of performing the operation is thus described.

"A piece of thin horn, or a plate of silver, having a curvature corresponding with that of the eye-lid, is to be introduced, and its concavity turned towards the globe, within the eye-lid, which is to be stretched upon it. An incision is to be made through the integuments and orbicularis palpebrarum, immediately behind the roots of the cilia to the tarsus, and should extend from the punctum lachrymale to the external angle. The exterior surface of the tarsus is then to be dissected until the orbital margin is exposed, when the conjunctiva is to be cut through directly by the side of the tarsus, which must now be disengaged at each extremity, the only caution necessary being to leave the punctum lachrymale uninjured.

“ Nothing can be more simple than this piece of dissection; and if any embarrassment arises, it is from the hæmorrhage of the ciliary artery, which must necessarily be divided; and this hæmorrhage renders it somewhat difficult to observe the punctum, when one wishes to divide the tarsus by the side of it. If the operation itself be simple, the subsequent treatment is still more simple than the operation. In a word, no dressing is necessary, and it is only advisable to cover the eye, to conceal a disagreeable object from the patient’s friends. In a few days, an union will have commenced between the section of the integuments and conjunctiva, and the elevation of the skin will go on like that of the original eye-lid, less complete indeed, but sufficiently so, to leave the pupil clear during a moderate elevation of the eye. In all the patients on whom I have operated, a fungus of considerable size has sprouted from the centre of the section. This must of course be managed by caustic or the knife; and the latter is to be preferred, because it excites no subsequent irritation.

“ Inflammation of the conjunctiva will sometimes produce an inversion of the inferior palpebra; this may easily be obviated by keeping the eye-lid depressed by means of strips of adhesive plaster. In severe ophthalmias, the conjunctiva becomes much swelled and sometimes protrudes; this being exposed to pressure and friction will thicken, and indurate to a very great degree. In such cases, the author recommends excision of the part of the conjunctiva which is thickened and is the cause of the inversion; after which operation, a compress is to be applied that will carry the orbital edge of the tarsus inwards. This compress will resist for a time the contraction of the orbicularis, and when the cicatrization at the orbital margin is complete, the eye-lid will maintain its proper situation.”

In addition to the three complete Essays above noticed, the author had left a great number of notes and cases, which have been brought together and carefully arranged by the editor, and form the remainder of this interesting volume. The fourth chapter is intitled “ On some of the more important Terminations of Ophthalmia,” and contains a variety of cases and observations in illustration and support of the principles previously laid down by the author. The terminations here men-

tioned are, 1st, by effusion of coagulated lymph; 2d, by supuration; 3d, by slough; 4th, by ulceration. Had it not been that the editor was desirous to give in the form in which they were found the three first essays, these latter observations of the author might have been incorporated with advantage into the body of those essays, a work which would most probably have been performed by the author, had he lived to commit his labours to the press. Having in the preceding part stated the general doctrines of the author, as contained in the three first chapters, it is unnecessary to enter very minutely into the contents of this; a few points, however, are worthy of attention, and to which we shall now advert. The destruction of vision, when it occurs as a consequence of inflammation of the conjunctiva, is considered by the author as being most frequently produced by sloughs, or ill-conditioned ulcers of the cornea. This opinion leads to a practical indication of much importance; that, although during the continuance of acute inflammation, evacuations are to be employed proportioned to the intensity of the inflammation and the strength of the patient; yet, when the inflammation has lapsed into ill-conditioned ulceration, or more especially into slough, cinchona is to be freely administered to support the prostrate powers of the system. This practice is recommended both in the infant and the adult, and the propriety and success of the treatment is enforced by several cases, from which we extract the following:

“Sept. 19, 1806, Thomas Green, a middle-aged man, applied with a violent inflammation of both eyes, and bore in his hand a handkerchief stained of a straw colour with the discharge that issued from the eye-lids; the conjunctiva was highly red and villous, no distinct vessels being visible on that of the palpebræ, and to a certain degree they were obscure on that of the eye-ball; the pain was by no means great; the inflammation came on suddenly, with a sensation of grittiness, five or six days previously to his application. Twelve ounces of blood were taken from his arm, and he was directed to take purging powders of calomel and jalap, on the 19th and 20th.

“21st, Morning. The cornea of the right eye, which, on the 19th was slightly opake at three different places, now presented three distinct ulcerated surfaces, clear grooves, almost

through the cornea. The iris and anterior chamber were perfectly free from change. Four leeches were applied to the right palpebræ and three to the left, and a purging draught was ordered. Evening; the inflammation of the left conjunctiva had decreased, and the puriform discharge was less. The right remained in the state described in the morning. Four leeches were applied.

“22d, Morning. Four leeches were applied to the right palpebræ, and a dose of a cathartic mixture was given every four hours. Evening; three leeches were applied.

“23d, The ulcers were apparently filling up.

“24th, The ulcers were overlapped by the conjunctiva. A purging powder was prescribed for him.

“25th and 26th. The ulcers were filling up; the cathartic was daily repeated.

“27th. The inflammation was increased in a slight degree; leeches were applied to the palpebræ, and a dose of ol. Ricini was given. Evening; the inflammation was rather mitigated.

“29th. One of the pits was a little deeper, others were stationary.

“From the 29th of September to the 7th of October, the ulcers were stationary and without vigour; during this time he took a laxative every other morning.

“Oct. 7th. Observing that the pulse was languid and small, and that the process of restoration did not go on with sufficient celerity, I resolved on giving the cinchona.

“8th. Two drachms of the extractum cinchonæ, dissolved in equal parts of aq. menth. pip. and aq. ammoniæ acet. were taken in twenty-four hours.

“10th. The same medicines had been continued; the improvement was remarkable and decisive; the ulcers were healing through their whole extent. I increased the extractum cinchonæ to three drachms daily.

“11th. The ophthalmia had ceased, and the ulcerated groove was filling up fast.

“Nov. 10th. The ulcers were quite healed, and his vision was perfect.”

In the fifth chapter are given a few histories, illustrating some of the more important changes of structure in the eye;

these are accompanied by plates, showing the various stages of disorganization of the organ of vision, in cases where the structure of the eye is changed by the growth and protrusion of fungous tumours, either of a malignant nature or otherwise.

A few observations are premised on the combination of amaurosis with cataract, generally an incurable disease, and which it is of importance to distinguish from simple and uncombined cataract, with which, in its incomplete state it is often confounded. The diagnostic signs of this species of amaurosis are, "a pupil somewhat dilated and still, or sluggishly contracting over a yellowish lens, even in a strong light, with a tendency in the vessels on the anterior part of the globe to assume a fascicular arrangement." In one form of amaurosis depending on organic affection, the pupil is not only motionless, or nearly so, but it is also contracted and irregular, and the humours are misty; this is said to be the most common form of the disease. The cases of malignant fungi here recorded, afford additional evidence of the incurable nature of this disease; in no one instance was even the extirpation of the eye attended with complete success or the disease radically cured.

The treatment of congenital cataract has been so materially improved by Mr. Saunders, that a great part of his justly acquired reputation has been obtained by his success in operating on cases of this description. In chapter the sixth and last, we are presented with many observations on this disease, a description of the operations employed by the author for its relief, and the general result of his practice. In the congenital cataract the lens is most frequently either partially or completely absorbed, and the cataract is purely capsular; to effect, therefore, a permanent aperture in the centre of this membrane is the requisite business of art, and applies, indeed, to every case of congenital cataract which can occur. From June 1806 to December 1809, sixty cases were submitted to the author's care; the following table contains a statement of the appearances noted in forty-four of these cases, and exhibits their proportion to each other.

"Solid opaque lens, with or without opacity of the capsule, three single, two double cataracts - -	$\left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 5$	"Fluid cataract, with opacity of the capsule, two single - - - - -	$\left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 2$
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"Solid lens, opake in the centre, transparent in the circumference, with cap- sule in the same state, five double - - - - -	} 5	"Fluid cataract, with opaci- ty of the capsule and closed pupil, two double - - -	} 2
"Soft opake lens, with or without opacity of the capsule, two single, two double - - - - -	} 4	"Opake and thickened cap- sule, the lens being com- pletely absorbed, or the remains of it being thin and squamose, six single, twelve double - - -	} 18
"Soft opake lens, with solid nucleus, one single, two double - - - - -	} 3	"Opake and thickened cap- sule, with only a very small nucleus of the lens unab- sorbed in the centre, two single - - - - -	} 2
"Soft opake lens with dotted capsule, the spots white, the spaces transparent, two double - - - - -	} 2	"Opake and thickened cap- sule in the centre, remains of the lens in the circum- ference, one double - - -	} 1

It is a very curious and affecting fact, observed by the author, that this disease, in many instances, attacks successively the children of the same parents. He mentions that two brothers, between whose ages there was a difference of six years, were both affected with congenital cataracts. In a second family, two brothers, twins, became blind with cataracts at the age of twenty-one months, each within a few days of the other. In a third family, a brother and two sisters were born with this disease; the eldest sister was affected with it only in one eye; the brother and youngest sister in both eyes. In a fourth family, three brothers and a sister had all congenital cataracts. It is remarkable that the same character was preserved in the cataracts of several children of the same family.

The excessive mobility of the eye, the unsteadiness of the little patient, the small field for the operation, and the flexibility of the opake capsule, are the difficulties with which the surgeon has to contend. These obstacles were all overcome by the author in his method of performing the operation. He was accustomed to dilate the pupil by means of belladonna, and employed a diminutive needle, armed with a cutting edge from its shoulders to its point, and thin enough to penetrate with

the most perfect facility. The operation employed by the author for the cure of congenital cataract, was neither the extraction of the lens, as usually performed, nor the depression of it, as in couching; it was an *operation on the capsule*, founded upon the knowledge that Nature herself always endeavours to remove the opake lens, but is inadequate to overcome the opacity of the capsule. The mode of performing the operation must be varied according to the state of the parts concerned in obstructing vision. Ample directions are given for the method of proceeding under the different circumstances of disease, the operation being distinguished into the anterior and posterior, according as the cornea or sclerotica is to be pierced. "The number of operations which may be necessary to accomplish the cure of a congenital cataract will very much depend on the texture of the capsule, and the size of the lens. It is frequently cured by a single operation, more frequently it requires two, often three, sometimes four, but very rarely five. The period of cure will of course depend on the same circumstances. Some are cured in a few days, the greater number in one or two months; in many the process is protracted to three; and in a few to four, or even five months."

The following is stated to be the total result of the author's operations on the congenital cataract. In sixty patients he succeeded in giving sight to fifty-two. In thirteen of them he operated on single eyes. In two of these, one of whom was an idiot, a pupil of each was completely cleared; but the retina being insensible, the operation was not attempted on the other eyes. In a third the result is not noted, except that he considered it a hopeless case when the operation was tried. A fourth was altogether unmanageable, being not only afflicted with congenital blindness but also deafness. In a fifth the eye was lost by suppuration. In the remaining eight he was successful; of these, five had each previously lost an eye; one by variola, and four by operations performed by other surgeons; three resulting from attempts to extract. In forty-seven patients he operated on both eyes. In one of these, who was an idiot, no vision was obtained, although a permanent aperture was made in each capsule. In a second, the operation was completely successful on one eye, but failed in the other by the superven-

tion of acute inflammation, which closed the pupil with lymph. In a third, the operation proved unsuccessful in both eyes, by the same result as the last, a closed pupil from adhesive inflammation. In a fourth, the consequent inflammation passed into suppuration, but the other eye was cured. Two were under care at the time of his death, one of whom was already cured in a single eye. Forty-one were cured in both eyes.

These operations were performed on patients at the following ages: five from two to nine months; nine from thirteen months to two years; four from two and a half to three years; five from three and a half to four years; eight from four to six years; seven at seven years; eight from seven to nine; ten from nine to fifteen; four from twenty to twenty-eight. Notwithstanding thirty-eight of these patients were at the interdicted age, it is observed, that the operation failed in only two of them; in one, at the age of three years and a half, who had an insensible retina, and was an idiot; in the other, at the age of seven years, by adhesive inflammation.

The operation on the capsule, although the only one which is suited to the child, is not necessarily confined to that age; it is no less applicable to the cataract of the adult. The inconveniences attending this operation in the adult arise from the circumstance of a more frequent occurrence of acute inflammation. In the ordinary cataract of the adult, the lens is comparatively hard and slow of solution, especially its nucleus or central part, and when it loses the support of the anterior lamella of the capsule from the extensive division of that membrane, it is apt to revolve on the instrument, or, by a partial dislocation, to produce a permanent pressure on the iris. Inflammation rarely followed the operation in the capsular cataract; in the lenticular the inflammation was in proportion to the irritation or pressure which the iris sustained. To diminish the risk of inflammation, therefore, while the lens should be subjected to the action of the aqueous humour, in which it is soluble except when in an ossified state (a rare disease), was the grand point to be attained. With this view the author considerably reduced the size of his needle, and performed the operation rather differently than he had formerly done. He made an aperture in the centre of the capsule, not exceeding the ordinary size of the

pupil. "Thus, whilst the opening was large enough to subject the lens to the action of the aqueous humour, *a sufficient portion of the circumference of the interior lamella of the capsule was preserved to confine the lens in its seat.* The lens itself he used tenderly, working a little at its centre with a lateral motion of the needle, which is by far the safest method of opening its texture. Sometimes the touch with the instrument was directed backward, to avoid the slightest pressure on the iris. He was now content to obtain, by several operations, what in his first method of proceeding he had gained by two."

Whether the advantages derived from the capsular operation, recommended by the author, render it superior to those commonly hitherto employed, the extraction or depression of the cataract, is a question which must be left for the future decision of surgeons, who shall make trial of them respectively. If it shall appear that a more frequent or more permanent cure is obtained, although this be more slowly accomplished than in either of the other methods, it will deserve to be preferred to those; and may, in no long time, almost supersede them. In the adult, it is said, if the texture of the lens is nearly uniform and permeable, the cure is completed in a space of from three to five months; but if the texture is firmer, and the nucleus large, the cure cannot be accomplished in less than seven months. The author himself had not finally made up his mind, whether, in cases where the texture of the lens was unusually hard, extraction was not the preferable operation in the hands of the surgeon, who, like himself, could perform that operation with dexterity; with respect to the softer lens, or the capsular cataract, he was satisfied of the superiority of his operation. The excellence of this operation is confirmed by the experience of Dr. Travers, the successor of the author in the Infirmary; who, since his appointment, we are informed, has cured by it forty-seven patients; and although many of these were cases of congenital cataract, the majority were cases of ordinary cataract in the adult, in whom the lens was frequently of a firm texture.

The following cases of congenital cataracts, successfully treated by the author, we give in his own words:

"Elizabeth Angier, born blind with cataracts, was submitted to the operation at the age of two years and two months.

"Nov. 8th, 1807. I operated on both eyes. The cataracts were chiefly membranous and tough. The capsule was opened extensively in the left eye, and little less in the right.

"21st. The right capsule had re-united, but a considerable absorption of its contents had taken place. In the left eye the remains of the lens was concave, and the rent in the capsule had not coalesced. The operations were repeated. In the right eye I opened the capsule extensively, but exactly in its center. A large portion of it was very dense and opaque. In the left a small nucleus was detached, and pushed through the pupil, leaving it clear.

"22d. The pupil of the left eye continued clear, and the small nucleus lay in the anterior chamber without exciting ophthalmia. This right capsule remained open.

"28th. No ophthalmia followed the operations. She saw with the right eye, although in the upper part of the pupil a large portion of the capsule remained. The nucleus in the left wasted fast.

"Dec. 6th. The operation was repeated in the right eye, and the lower part of the capsule was lacerated, but she disengaged her head, and I was obliged to withdraw the needle without detaching the capsule to the extent which I had intended.

"7th. The inflammation was slight, but some adhesions of the capsule to the iris were about to take place. The belladonna was applied.

"12th. An absorption of all the lower part of the cataract in the right eye had taken place. The nucleus in the anterior chamber of the left eye was almost gone.

"Jan. 4th, 1808. Both eyes were cured."

Contrary to the usual practice of book-making, wherein a very small quantity of new matter is sparingly diffused through several extensive volumes, we have here a large mass of valuable information, concisely related in clear and perspicuous language; although a number of well engraven and beautifully coloured plates necessarily render the work rather expensive.

ORIGINAL PAPERS.

Account of a new Mode of extracting Poisonous Substances from the Stomach. By PHILIP S. PHYSICK, M. D. Professor of Surgery in the University of Pennsylvania.

ON Thursday 6th June, 1812, I was sent for in much haste at nine o'clock in the evening, to visit two children of Mr. S. B. each three months old. They were twins, and had been affected with whooping cough for several weeks. The mother informed me that in consequence of her children having been very restless the night before, she had this evening given them some laudanum. To William she had given one drop at seven o'clock, and the same dose to Edmund forty minutes afterwards.

I found William in a state of stupor or very profound sleep, from which he could not be roused, and was informed, that just before my arrival, his whole body had been strongly convulsed; his breathing was laborious and his pulse feeble and slow. On inquiry, I found that the vial out of which the drop of laudanum had been given, had contained, several weeks before, nearly one ounce of that medicine, but having been left without a cork, it had dried away so much that one drop only could be obtained for William; in order to procure another drop, two drops of water had been put into the vial and stirred about, by which another drop had been obtained and given to Edmund, forty minutes having intervened between the two doses.

About a quarter of an hour before my visit, the mother had given to William fifteen drops of antimonial wine, but as it had produced no effect I prescribed an emetic of ipecacuanha, and directed it to be given immediately; this however was found impracticable, as the child was incapable of swallowing.

At half past nine o'clock, Edmund, who had appeared to be in a very easy sleep, became convulsed, and his pulse and breathing were affected in the same way that his brother's had been. We attempted to give him ipecacuanha, but could not

make him swallow it. The countenances of the children became livid,—their breathing very laborious; with long intervals between the times of each inspiration, and the pulse in each very feeble.

Under these circumstances it clearly appeared no time was to be lost, and therefore, as they could not swallow any thing, I determined to inject an emetic into their stomachs. For this purpose a large flexible catheter was passed through the mouth down the œsophagus into the stomach, and through this, one drachm of ipecacuanha mixed with water was quickly injected by means of a common pewter syringe. In hopes that the emetic would operate, I waited some time without any effect being produced. William exhibited now every symptom of speedy dissolution,—his face became very livid;—the pulse and respiration had almost ceased; and indeed the pulse could not be perceived, except a faint stroke or two, after that kind of imperfect and convulsive inspiration which is commonly observed in children just before actual death, accompanied with a convulsed action of the muscles of the mouth and neck. In this situation I passed the catheter again, and by applying the syringe to its projecting end, drew up the fluid contents of the stomach, and immediately injected warm water which was again withdrawn.* These operations were alternated two or three times, but when completed no sign of life remained. Hopeless as the case now appeared, I injected some spirit† and water mixed with a little vinegar through the catheter;—in less than one minute the child again inspired, the pulse became perceptible at the wrist, and in four minutes, with the aid of external stimuli, both went on so perfectly that there was every reason to believe the child would recover.‡

* The idea of washing out the stomach with a syringe and tube, in cases where large quantities of laudanum or other poisons had been swallowed, occurred to me at least twelve years ago, and I have constantly, for many years, recommended it in my lectures. In the year 1809, Dr. Dorsey performed the operation of washing out the stomach in such a case, but the patient had taken the poison twelve hours before he was called, so that he did not succeed. ☞ Since writing the above, I have been informed that in an European journal, a French surgeon has lately proposed injecting the stomach. My informant has unfortunately mislaid the pamphlet.

† See Medical Repository, volume 5, page 347.

‡ It might be suspected, that the catheter passing through the fauces,

By the time that these operations were performed on William, Edmund was observed to have passed into the same condition of apparent death, from which his brother had just recovered. The same measures were adopted in his case, and with the same happy effect. I now flattered myself that the children would do well, but in this expectation I was disappointed. In about half an hour, Edmund's breathing became very slow and laborious, and his pulse which had before been very much excited became so feeble, that he appeared to be sinking very fast. Supposing that the effects observed, might be produced by the spirit which had been given, occasioning intoxication, I determined to extract it from the stomach and to inject warm water, removing it again. This operation was very quickly performed, but at the conclusion of it I was much distressed by seeing the little patient to all appearance lifeless. Observing in this case, that the actions of life ceased so immediately after the extraction of the spirit, I determined to try it again, and injected a little weak brandy and water. In less than a minute this occasioned a repetition of breathing and of the action of the heart, and in about five minutes both were regularly performed. The symptoms of ebriety took place also in William, but observing that his brother had been nearly lost by extracting the spirit from his stomach, I did not attempt the removal of it in William's case.

Doctor Austin who kindly assisted me on this occasion, remained all night with my little patients. He informed me, that after some time they became better, though they both had slight convulsive motions occasionally through the night. Their bowels were moved several times by castor oil. After five o'clock in the morning Edmund had no convulsions, but they continued with William until twenty-five minutes after nine, when he struggled a little, sighed, and expired. Edmund was troubled for two or three days with a diarrhœa, but soon recovered completely.

would endanger suffocation from its situation over the top of the larynx, but this was not the case, because the children recommenced breathing before the instrument was removed. I found also with my finger, that the instrument rested on one side or other of the epiglottis, so that it could not obstruct the glottis.

Two Cases of Simple Fracture, in which Ossific Union was promoted by the Use of Caustic Issues. By JOSEPH HARTSHORNE, M. D. one of the Physicians of the Pennsylvania Hospital.

IN the year 1805, a case of simple fracture of the external condyl of the os femoris was placed under my care. As no bony union had taken place four months after the accident, an attempt was made to increase the action of the vessels, by rubbing the fragments against each other. The patient was confined to his bed, and the limb was kept in the extended position and in a state of rest, by means of splints and bandages. This treatment was continued three weeks without producing any advantage. The use of a seton, which had succeeded so well in the practice of Dr. Physick, was in this case inadmissible, as it could not have been introduced without wounding the capsular ligament of the knee joint. A large issue was made by applying caustic potash to the integuments immediately over the injured part. In about twenty days the fragments became firmly united.

ANTHONY HAMMOND aged twenty-four years, had his right os humeri fractured on the 22d January 1811; and requested my advice on the 17th June of the same year. The extremities of the fragments passed each other about two inches, forming an artificial joint a little below the insertion of the deltoid muscle. As his maintenance depended upon daily labour, the man was extremely anxious that some attempt should be immediately made to restore the use of his arm. An issue three inches in length and one inch in breadth, was made in the integuments by means of lapis septicus near the place of fracture. The patient was at the same time informed, that if this practice should not be successful, the introduction of a seton between the fragments, would still afford some hope of recovery, and be attended with less danger in the autumnal and winter months, than during the heat of summer.

Ten days after the application of the caustic, the os humeri became considerably enlarged.

A bandage was now passed round the whole arm, beginning

at the hand, and splints were applied to the fracture so as to make firm compression. On the 7th of July, twenty days after the caustic had been used, the process of union had commenced. The patient complained of pain in the whole arm; the bone had become enlarged to more than twice the natural size, and there was much less motion of the fragments when an attempt was made to raise the limb.

The issue was kept open, and the application of splints and bandages was continued until the 22d August. At this time no motion whatever could be perceived in the place of fracture, and the man could easily move his arm in every direction. Early in September, as a slight degree of motion was perceptible, the caustic was again applied so as to produce an issue, which was kept open two weeks.

A considerable enlargement of the os humeri again succeeded the use of the caustic. A very obscure degree of motion could still be observed by careful examination.

The patient was dismissed about the middle of September, with a request that he would call on me in the course of a few weeks. Three or four days after leaving me, he entered on board a vessel bound to Europe. On the passage he was impressed into the service of the British frigate *Belvidere*.

He arrived in this city in September 1812, and informed me that he had been able, during the whole of the time he remained on board ship, to perform the most laborious part of a sailor's duty.

Philadelphia, Sept. 23d, 1812.

MEDICAL INTELLIGENCE.

Communications relative to the Datura Stramonium, or Thorn Apple: as a Cure or Relief of Asthma: addressed to the Editor of the Monthly Magazine; several of them never before published. Lond. 1811. pp. 90.

[From the Edinburgh Medical and Surgical Journal, for July 1812.]

IT is a trite observation, that on the introduction of new, or revival of neglected remedies, two opposite faults are frequently committed. By some they are extolled for powers which they do not possess, while others deny them all virtues; and it is seldom, until after repeated fluctuations, that their real value is at last ascertained and generally admitted.

The subject of this treatise furnishes a striking example of the truth of these remarks. Stramonium was for a short time extolled as an almost infallible remedy in the cure of mania and melancholia, and then fell into total neglect. Once more it has become fashionable, for the cure of a totally different disease, and its newly ascribed powers are still a matter of keen controversy.

The first public notice of these was in a letter to the editor of the Monthly Magazine, signed *Verax*, but now acknowledged by Mr. Sills, a respectable merchant in London, who had derived great benefit from its use. The history, however, of its introduction, is very concisely detailed in the following letter, from Dr. Sims of Guilford Street.

“Some time in the year 1802, I received from General Gent a remedy that he had, not long before, brought from Madras, which, the general informed me, was used there as a specific for relieving the paroxysm of asthma, and that it was prepared from the roots of the wild purple-flowered thorn-apple (*Datura ferox*.) The roots had been cut into slips as soon as gathered, dried in the shade, and then beat into fibres resembling coarse hemp. The mode of using it was by smoking it in a pipe at the time of the paroxysm, either by itself or mixed with tobacco, according as the patients were previously addicted to smoking or not. General Gent procured this remedy from Dr.

Anderson, physician general at Madras, who both recommended it, and, I believe, used it himself.

“ I happened at this time to be attending the daughter of an eminent physician, labouring under phthisis pulmonalis, combined with asthma, as appeared to me from the frequent paroxysms of difficulty of breathing, not usual in pure phthisis, at least in so early a stage of the disorder. With a view of alleviating these distressing paroxysms, I recommended a trial of this remedy, which to me was at that time perfectly new. The relief obtained was far beyond expectation, and, although gradually sinking under an incurable disease, this amiable lady continued to experience great satisfaction in its use, almost to the fatal termination.

“ Soon after this, meeting with Mr. Toulmin, surgeon of Hackney, at a time when he was much harassed by frequent paroxysms of asthma, under which he had been suffering for several years, I recommended the same remedy to him. He received so much benefit from its use, that I gladly transferred all the remedy that I had left to him. But the quantity not being sufficient to last long, he was obliged to have recourse to our common thorn-apple (*datura stramonium*,) of which I had advised him to try the stalks, as the roots of this species are small and fibrous. Mr. Toulmin experienced nearly the same relief from this as from the East India plant: he likewise tried the leaves, but could hardly distinguish these from tobacco, either in taste or effects. From Mr. Toulmin, the knowledge of this remedy was communicated, among others, to your correspondent (Mr. Sills.)

“ I have two purposes to answer by the above communication. In the first place, it will serve to point out the history of the introduction of a remedy which promises to become an important addition to the materia medica; not that I can claim any merit from the share that I have accidentally had in it; but the principal intention I have had in view, was to show that the original remedy, as used in the East Indies, is not exactly the same as what is used here. It is indeed highly probable that both species have nearly similar virtues, but the one may perhaps be more efficacious than the other. It is to be hoped that prepared roots will be imported from Madras, in order that

such patients as may not have experienced the promised relief from smoking the stalks of *Datura Stramonium*, may have an opportunity of trying whether the roots of *Datura Ferox* may be efficacious.

“More care ought to be taken in the preparation of the stramonium than is usually done. The stalks ought to be cut into slender slips while recent, and dried quickly. In our climate the general direction of drying in the shade is injurious to most herbs; the quicker they are dried the more they contain of the taste and colour, and consequently of the virtues of the fresh plants. I observe, that, of late, the whole plant is sold in the physic herb-shops, as a remedy for the asthma. Now it ought to be generally known that the leaves, and more especially the unripe capsule and seeds of the thorn-apple, are a very powerful, nay, even a deleterious narcotic, if taken internally, and probably cannot, in all cases, be even smoked with impunity. Yet the leaves, according to the experience of Mr. Toulmin himself, are not possessed of the same powers, in allaying the asthmatic paroxysms, as the comparatively mild and innocent stalks and roots.”

We shall now make a few quotations from the cases contained in these letters. Mr. Sills first describes the symptoms of his asthma, and the effect of the stramonium upon him, and his manner of using it.

The asthmatic paroxysm usually came on about two o'clock in the morning, when I was suddenly surprised from sleep with violent convulsive heavings of the chest; and I was scarcely allowed time to place myself upright in a chair, where I sat resting myself upon my elbows, and with my feet upon the ground (for I could not bear them in a horizontal posture,) before I underwent a sense, as it were, of immediate suffocation. The fits generally continued, with short intermissions, from thirty-six hours to three days and nights successively; during which time I have often, in the seeming agonies of death, given myself over, and even wished for that termination of my miseries.

An amiable friend and most respectable surgeon at Hackney (Mr. Toulmin,) first persuaded me to smoke the divine

Stramonium, to which I owe altogether my present freedom from pain and renewed capacity of enjoyment.

It is the root only, and lower part of the stem of this plant, which seem to possess its anti-asthmatic virtue: these should be cut into small pieces, and put into a common tobacco-pipe, and the smoke must be swallowed, together with the saliva produced by the smoke; after which the sufferer will, in a few minutes, be relieved from all the convulsive heavings, and probably drop into a comfortable sleep, from which he will awake refreshed, and, in general, perfectly recovered: at least, this is the invariable effect produced upon myself. He should, by all means, avoid drinking with the pipe, a too ordinary accompaniment of smoking.

I once took some brandy and water with the pipe, but it proved a very improper combination: a dish of coffee, however, I often take after it, and find it highly refreshing. I should mention that strong coffee has frequently been recommended to me, but never produced any beneficial effect as a cure for asthma.

This plant is delightfully fragrant: and although it has been regarded hitherto as of a poisonous nature when taken inwardly, yet I have smoked a dozen pipes at a time, without experiencing from them any other inconvenience than a slight excoriation, or soreness of the tongue.

Dr. Reid says, that, in several other instances of similar disease, the success has been equally remarkable and complete. Mr. Willis of Bristol states its success in his own case; likewise Mr. Young of Aberdeen. W^r. Woodrow of Norwich states, that he has smoked the stramonium since last September, and almost invariably experienced great relief in respiration; but he did not find that it diminished the daily accumulations of phlegm. Mr. Radborn of Alveston in Derbyshire, a septuagenarian, was also greatly benefited by it; but it must be remarked that he used the stalks and seed vessels. The last testimony in favour of the stramonium which we shall notice, is in the following letter from Mr. Sills.

“ You are at perfect liberty to make every use of my name respecting the stramonium you think proper, and may add, that I continue to derive increased good effects from the use

of it. In truth, the asthma is destroyed! I drink beer, eat of every thing; and if my mind was as free from perplexity as my body is from asthma, I should again enjoy my existence. I never experienced torpor or any ill effect whatever; and I would rather be without life than without stramonium."

This evidence, though far from decisive, is sufficient to entitle the stramonium to a fair and varied trial, under the superintendence of attentive practitioners. Of the activity of many parts of the stramonium, there are unfortunately too many proofs on record, and we fear that its indiscriminate use as a popular remedy may be attended with danger, especially as we well know that the leaves and seed-vessels, and even the poisonous seeds, are often used instead of the principal stalk, which is the part specially recommended, and is *said* to be comparatively mild and innocent. We should also think that the direction given to swallow the saliva excited by inhaling its smoke, ought to be followed with great caution. From the analogy of tobacco, we should fear that it would be extremely apt to derange the stomach, for we know that experienced smokers carefully avoid swallowing the saliva impregnated with the condensed fumes of the smoke. Besides, we consider the novelty and advantage of the practice of *smoking* stramonium, to consist in applying the remedy directly to the seat of the disease. The coloured engraving, said to represent the *Datura Stramonium* in flower, is execrable, and gives no idea of the plant. It is easily cultivated, like any other hardy annual.

Letter from SIR JOHN SINCLAIR, Bart. to the President of the College of Physicians, at Edinburgh, on the Remedy lately discovered for Calculous Complaints.

[From the London Medical and Physical Journal, for July, 1812.]

SIR,

I am persuaded that you will concur with me in opinion, that there are no complaints incident to mankind, for which it is more desirable to discover a cure, or even a safe and effectual means of prevention, than those of a calculous nature. The miseries felt by those who are afflicted with the stone or

gravel, are dreadful beyond description; and any cure effected by surgical operation, is not only of a nature peculiarly severe, and often fatal, but does not always prevent a repetition of the complaint. It is with much pleasure, therefore, that I call the attention of the respectable body over whom you preside, to the means which have been recently discovered, by which calculous complaints may, there is every reason to hope, be prevented from proving, in future, so formidable a source of human misery.

The paper printed in the *Philosophical Transactions*, An. 1810, entitled, "Observations on the Effects of Magnesia in preventing an increased formation of the Uric Acid," written by Mr. William T. Brande, is the first suggestion, so far as my information reaches, that has been published, recommending magnesia as an antidote to the formation of stone or gravel.

The inquiries of that eminent surgeon, Mr. Home, into the functions of the stomach, and his discovery that liquids pass from the cardiac portion into the circulation of the blood, (*Philos. Trans.* April 1808,) led him to consider that the generality of calculous complaints might possibly be prevented, by introducing into the stomach such substances as are capable of preventing the formation of uric acid; and that this mode of treatment would have many advantages over the usual method, which consists in attempting to dissolve the uric acid after it is formed.

He consulted, it would appear, Mr. Hatchett, on the substance most likely to produce this effect; and that respectable chemist concurred with him in opinion, that magnesia, from its insolubility in water, was peculiarly well adapted for the purpose, as it would remain in the stomach, until it should combine with any acid, or be carried along with the food to the pylorus.

These gentlemen, anxious to have a complete investigation of a subject so peculiarly interesting, requested Mr. Brande to assist them in the prosecution of it; and many opportunities having occurred of carrying on the inquiry, during an attendance on patients afflicted with calculous complaints, the results of their joint labours were communicated to the Royal Society, in the important paper I have alluded to, which is earnest-

ly recommended to the consideration of every medical person, who may have patients afflicted with such complaints under his care.

As calculous matters are not uniformly of the same description, it is certainly desirable to ascertain, by the assistance of some medical person, the specific nature of the complaint with which any individual is afflicted; but, being anxious that those who are at a distance from medical aid, or who cannot, perhaps, afford to procure it, should be able to avail themselves of this new discovery, I took the liberty of applying to Mr. Brande for a short statement of the manner in which the remedy ought, in general, to be applied; and he, with that liberality which belongs to true genius, has furnished me with the following particulars.

“The best method of giving the magnesia is in plain water, or milk, to be taken in the morning early, and at mid-day. If the stomach is weak, and this produces flatulency, or uneasy sensations, some common bitter, such as gentian, may be taken with it: if it purges, a little opium may be added.

“The mode in which magnesia operates in preventing the formation of stone or gravel, Mr. Brande believes to be, by preventing the formation of acid in the stomach.

“Where there is a stone actually formed in the bladder, it is of advantage (if the case is a proper one for the use of magnesia) by preventing its increasing in size.

“The dose of magnesia must entirely depend upon the circumstances of the case—*generally*, five grains, twice or thrice a day to children below ten years of age; fifteen and twenty grains to adults.

“Mr. Brande has always given common magnesia. The calcined may occasionally be used with advantage. Any omission of the remedy for a time must entirely depend on the state of the patient.

“In regard to diet, no particular regimen is necessary. Animal food may be taken in the same quantities, and of the same sorts as usual. The patient should avoid strong wines, such as Port and Madeira, and indeed should abstain from pure wine altogether. Spirits should not be taken in any form. Lemons and vinegar need not be absolutely avoided, unless the bowels

are too open. Oranges and other fruits, when ripe, may be taken."

There is every reason to hope, from the success that has already attended the application of this remedy in various cases, that it may prove an effectual means of preventing the greatest proportion of calculous complaints; and it is impossible to foresee, to what a state of improvement it may yet be brought, in the course of further experience, when the attention of a number of able and learned men (as I trust will be the case) is directed to its application.

Perhaps there is no disorder to which mankind is liable, for which nature has not provided some remedy, or at least some means of alleviation, though, in both respects, much remains to be learnt; and any discovery that can be serviceable in calculous complaints, from the infinite distress they occasion, must prove, in a peculiar manner, gratifying to every real friend to the happiness of the human race.

I have the honour to be, Sir,

Your humble and obedient servant,

JOHN SINCLAIR.

27, Old Burlington-Street, May 7, 1812.

P. S. Since this letter was written, I have met with another interesting paper, containing some valuable hints regarding the Cure of Gravel.* Instead of soda-water, or the *aqua mephitica alkalina*, the author recommends, for adults, the following medicine: "a drachm, or two scruples, of mild vegetable alkali, otherwise called salt of wormwood, or salt of tartar, dissolved in two ounces of water, sweetened with two drachms of honey, to be taken with half an ounce of lemon-juice three times a-day." On this medicine it is to be observed—1. That honey is serviceable in calculous complaints, and is preferable to sugar. 2. That the use of honey renders any opening medicine in general unnecessary, even when opium, as is subsequently recommended, is administered. 3. That, according to the above plan, more alkali is given than the stomach could

* Entitled, "On the Effects of large Doses of mild vegetable Alkali, or Potassa Carbonata, in Gravel, and the beneficial effects of Opium combined with it." By Gilbert Blane, M.D. Physician to the Prince of Wales.

otherwise bear. 4. That though the virtue of a large proportion of the alkali is probably impaired by the addition of the acid, yet that this is more than compensated by its accommodating the stomach to large doses of the alkali. 5. That the mischievous effects on the stomach, which so often take place from the use of the alkalies alone, are thereby prevented.

Where there is much pain combined with inflammation, bleeding may be necessary, or the addition of nitre to the saline draught; but where there is much pain, without the suspicion of inflammation, opium is highly advisable, in the proportion of from five to ten drops of laudanum, to each dose of alkali. The cure is thus rendered more expeditious, more certain, and more permanent. Indeed one of the principal objects of this tract alluded to, is to inculcate, from the author's experience, that the addition of opium gives greater certainty and permanency to the cure.

It may be further remarked, that, as there is a great variety in cases and constitutions, and as it appears by chemical analysis, that calculous concretions vary in the nature of their component parts, so must the remedies, according to these diversities. There are few cases, however, in which either this or the preceding plan of cure may not be successfully applied.

Curious and Interesting Experiment.

[From the Philosophical Magazine, for April 1812.]

A Edinburgh, Professor Leslie has just succeeded in freezing quicksilver by his frigorific process. This remarkable experiment was performed in the shop of Mr. Adie, optician, with an air-pump of a new and improved construction, made by that skilful artist. A wide thermometer tube, with a large bulb, was filled with mercury, and attached to a rod passing through a collar of leathers, from the top of a cylindrical receiver. This receiver, which was 7 inches wide, covered a deep flat bason of nearly the same width, and containing sulphuric acid, in the midst of which was placed an egg-cup half full of water. The inclosed air being reduced by the working of the pump to the 50th part, the bulb was repeatedly dipt in the water,

and again exposed to evaporation, till it became incrustated with a coat of ice about the 20th of an inch thick. The cup, with its water still unfrozen, was then removed, and the apparatus replaced, the coated bulb being pushed down to less than an inch from the surface of the sulphuric acid. On exhausting the receiver again, and continuing the operation, the icy crust at length started into divided fissures, owing probably to its being more contracted by the intense cold than the glass which it invested; and the mercury having gradually descended in the thermometer tube till it reached the point of congelation, suddenly sunk almost into the bulb, the gage standing at the 20th of an inch, and the included air being thus rarefied about 600 times. After a few minutes, the apparatus being removed, and the bulb broken, the quicksilver appeared a solid mass which bore the stroke of the hammer. The temperature of the apartment was then 54° of Fahrenheit.

In another experiment, with a small spirit of wine thermometer, under the same circumstances and the same degree of rarefaction, the cold produced was found to be $70\frac{1}{2}^{\circ}$ below nothing, or more than 30° below the point usually assigned for the congelation of mercury.

We understand that Mr. Leslie, from the commencement of these inquiries, confidently expected to be able to freeze quicksilver by such a process. In January last year, he maintained a cold within a degree of mercurial congelation during the space of eight hours; but his air pump not being then in perfect order, and some other parts of the apparatus being likewise defective, he was induced to defer the experiment for some time.

It is evident that such prodigious powers of refrigeration, and which will no doubt be further improved, open a wide field for philosophical investigation. Liquids which have hitherto resisted congelation may yet be rendered solid, and gases converted into liquids.

[From the London Medical and Physical Journal for July 1812.]

The publication of a second volume of the Transactions of the Medical and Chirurgical Society, shews very distinctly the flourishing state of that body, by the number of articles which it contains, the character of the contributors, and the addition to its members. But, as it is intended to give an analysis of this volume at a future time, nothing more than its prominent features will now be noticed.

In the medical department will be found a case of hydrocephalus internus; a paper on the use of oil of turpentine in tænia; a case of secondary small-pox, to which is appended an historical detail of similar cases, collected from the printed records of medicine; an account of a severe case of erythema, unconnected with mercurial action; on painful affections of the side with tumid spleen; a case of recovery from the effects of a large dose of arsenic; and on the effects of arsenic as a remedy for the bite of venomous snakes. The chirurgical class will be considered as particularly valuable when it is seen that Mr. Astley Cooper, Mr. Travers, Mr. Chevalier, and Dr. Hutchinson, have been contributors. The value of the chemical part is sufficiently characterized by the paper of Dr. Henry on the urine discharged in diabetes mellitus, by Dr. Bostock's experiments and observations on the serum of the blood, and by Dr. Marcet's chemical account of various dropsical fluids. The dissection of a limb, on which the operation for popliteal aneurism had been performed, by Mr. Astley Cooper, and a case of premature puberty in a female by Dr. Wall, are not the least interesting among these papers.

DIED—Lately at the island of Madeira, whither he had gone on account of ill health, ROBERT WILLAN, M. D. of London.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

At an Annual Election for Officers, held July 7th, the following persons were duly chosen.

President.

Dr. Adam Kuhn.

Vice-President.

Dr. Samuel Duffield.

Censors.

Dr. Thomas Parke.

Dr. Caspar Wistar.

Dr. Samuel P. Griffiths.

Dr. William Currie.

Treasurer.

Dr. Thomas C. James.

Secretary.

Dr. Joseph Parrish.

LIST OF NEW FOREIGN PUBLICATIONS.

Discourses on the Nature and Cure of Wounds. By J. Bell.
8vo.

Practical Observations on various novel modes of operating
on Cataract, and on forming an artificial Pupil. By R. Mu-
ter. 8vo. 4s. 6d.

An Inquiry into the Nature and Cause of Respiration. 2s. 6d.

A Treatise on the Diseases of the Eye. By I. Saunders.
Royal 8vo. 25s. 6d. or with the plates coloured, 31s. 6d.

The second volume of Transactions, published by the Medi-
and Chirurgical Society of London. 8vo. 16s.

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of the Intestines; illustrating the Treatment of penetrating
wounds and Strangulated Hernia. By Benjamin Travers.
With engravings. 8vo. 15s.

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Companion to the New London Pharmacopœia, for the use
of Students and Junior Practitioners. By Hyde Mathias
Browne. 8vo. 7s. 6d.

Cases of Apoplexy and Lethargy, with Observations upon the Comatose Diseases. By J. Cheyne, M. D. Fellow of the Royal College of Physicians, Edinburgh, Licentiate of the King and Queen's College of Physicians in Ireland, one of the Physicians to the Meath Hospital, and County of Dublin Infirmary, &c. 8vo. 8s.

The Morbid Anatomy of some of the most important Parts of the Human Body. By Matthew Baillie, M. D. F. R. S. L. and E. Physician Extraordinary to the King, Fellow of the Royal College of Physicians in London, and Honorary Fellow of the Royal College of Physicians in Edinburgh. The Fourth Edition, corrected. 8vo. 10s. 6d.

An Essay on Scrophula, in which an Account of the Effect of the Carbonas Ammoniaë, as a Remedy in that Disease, is submitted to the Medical Profession. By Charles Armstrong, M. D. Member of the Royal College of Surgeons in London. 8vo. 4s.

Report of the Medicinal Effects of an Aluminous Chalybeate Water lately discovered at Sandrocks, in the Parish of Chall in the Isle of Wight, pointing out its Efficacy in the Walcheren and other Diseases incident to Soldiers who have served abroad, and more particularly the Advantages to be derived from its introduction into private Practice. By William Lempriere, M. D. Physician to the Forces at the Army Depot. In one volume, 8vo. 5s. boards.

Recent American Publication.

An Inaugural Dissertation on the Medical properties of Gold. By John C. Cheeseman, Licentiate of the Medical Society of the state of New-York, and Vice-President of the Philo Medical Society. New-York. Collins and Co. 1812.

Proposed American Publication, by Kimber and Richardson, Philadelphia.

An Inquiry into the Diseases of the Mind By Benjamin Rush, M. D. Professor of the Institutes and Practice of Medicine, in the University of Pennsylvania.

N. B. This work will contain about 400 pages 8vo, and will embrace not only all the different forms of Madness, but the Physical History of the Disease of the Passions, and their respective Remedies.

THE
ECLECTIC REPERTORY
AND
ANALYTICAL REVIEW.

VOL. III.

JANUARY, 1813.

No. II.

SELECTED PAPERS.

On the Diseases of the Icelanders.

BY DR. HENRY HOLLAND.

[From the London Medical and Physical Journal, for February 1812.]

THE poverty of the Icelanders, and the dispersion of their small community over so vast an extent of country, render it almost impossible that medical practitioners should obtain an independent subsistence in the island. To obviate, as far as possible, this evil, a small medical establishment is provided at the public expense; consisting of a superintendant physician, who has the title of Landphysicus, an apothecary, and five subordinate medical men, who are stationed in different parts of the island. The physician and apothecary are settled in the vicinity of Reikiavik; where a house, somewhat superior in size and accommodation to the common class of Icelandic habitations, is provided for their reception. Independently of this provision, and the use of some land annexed to the house, the landphysicus has an annual salary of 600 rix-dollars, with the liberty to avail himself of the profits of any practice which his situation may afford. The present possessor of the office is Dr. Klog, a native of Iceland, but educated at Copenhagen. Of the country practitioners, one is stationed on the southern coast of the island, another on the eastern coast, a third on the

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northern, and two in the western province. The reader will readily conceive how entirely destitute of medical assistance many parts of the country must be, when it is mentioned, that some of these districts, subject to the care of a single individual, extend nearly 200 miles along the coast, with a breadth varying from ten to thirty miles. We had the opportunity, while in Iceland, of seeing two of the country practitioners; both very respectable men, and well informed in their profession. One of them, Mr. Paulson, has already been noticed, as possessing a more extensive knowledge of natural history than any of his countrymen.

With the exception of three hospitals, in which a few incurable lepers receive gratuitous support, no medical institution exists on the island. These hospitals are maintained at the public expense, and in a method worthy of being noticed, from its singularity. On a certain specified day, at that time of the year when the fishery on the coast is most abundant and successful, every fishing-boat in the island is required to contribute one man's share of the capture that has been made; a provision is added to the law, that, if the number of fish taken by any boat on this day does not afford a share of five to each fisherman, the contribution to the hospitals shall be delayed until the next time, when the produce of a day's fishing equals or exceeds this amount.

In speaking of the diseases of Iceland, it will be necessary to allude only to those which furnish any facts peculiar and interesting, or which are more especially connected with the climate and mode of living among the inhabitants.

The diet of the Icelanders consists almost solely of animal food; of which fish, either fresh or dried, forms by far the largest proportion. During the summer, they have milk and butter in considerable abundance; but of bread, and every other vegetable food, there is the utmost scarcity; and, among the lower classes, an almost entire privation. The want of cleanliness in the personal and domestic habits of the people, has been frequently alluded to; it is an evil incident to their situation, the removal of which could probably only be accomplished by the sacrifice of other habits, still more essential to their comfortable existence. As an effect of these circum-

stances in the mode of life of the Icelanders, cutaneous diseases, arising from a cachectic state of the body, are exceedingly frequent among them, and appear under some of their worst forms. Scurvy and leprosy are common in the island, occurring especially in the districts of Gutbringe and Snæfell Syssols, and on other parts of the western coast, where the inhabitants depend chiefly upon fishing, and where the pastures are inferior in extent and produce. The scurvy (*kreppusot*), as it appears in Iceland, presents no remarkable peculiarity of symptoms. The disease is observed to occur with greater frequency at those periods when there has been a deficiency of food among the inhabitants, or when the snow and frost of the winter succeed immediately to a wet autumnal season. For its cure a vegetable diet is employed, in as far as the circumstances of the Icelanders will allow of such means. Fruits of every kind are altogether wanting to them; but some advantage is derived from the employment of the cochlearia (*officinalis et darica*), of the *trifolium repens*, of the berries and tops of the *juniperus communis*, and of the *sedum acre*; plants which are indigenous in the island.

The leprosy of the Icelanders (*likthra*, *holdsveike*, or *spitel-ska*,) exhibits, in many instances, all the essential characters of the genuine elephantiasis, or *lepra arabum*; and is a disease of the most formidable and distressing kind. Indolent tumors of the face and limbs are generally among the first symptoms of the complaint, attended by swellings of the salivary, inguinal, and axillary, glands. The nostrils, ears, and lips, are progressively affected with swelling and deformity. The skin over the whole, or different parts of the body, becomes thick and hard, sometimes exhibiting a shining or unctuous surface, sometimes one rough and scabrous; which, at a more advanced period of the disease, displays numerous cracks or fissures. The senses are usually much enfeebled, and anæsthesia of the extremities generally occurs. The voice assumes a peculiar hoarseness and nasal tone, frequently with swelling of the tonsils, but without any hindrance of deglutition, until the disease has made a great progress in the habit of the patient: the breath and perspired matter are extremely fœtid; and the hairs and nails frequently fall off. The tumors in the different parts of

the body gradually pass into malignant ulcers, which discharge an acrid unhealthy matter. In this state the patient often lingers during a long life; or, when the disease has a more speedy termination, all the symptoms are rapidly aggravated, and he is carried off in a state of extreme debility and wretchedness.*

When it is considered how frequently unsuccessful the treatment of this disease is in more auspicious regions, it will not excite surprise that in Iceland the attempt at cure should generally be unavailing, where, from the situation of the patient, medical assistance can be obtained. Laxatives, diaphoretics, and issues, or sometimes even venesection, are employed in the earlier stages, or with a prophylactic view. The indigenous plants which the natives employ as remedies, are, the juniper, the *vaccinium myrtillus*, the *rhodiolarosea*, and the *dryas octopetala*; the latter of which, particularly, grows in great abundance on the island. These remedies, however, appear to be of little avail in relieving any of the urgent symptoms of the disease.

It does not appear that any distinct record exists in Iceland of the first appearance of the leprosy in this country. The Chevalier Bach, in his letter to Dr. Van Troil on the subject, thinks it probable that the disease was brought into Iceland from Asia or the South of Europe, at the time of the crusades; in which he asserts, that these Icelanders bore a part with the other nations of Europe.† From the Ecclesiastical History of Iceland, it appears that the latter statement is not well founded; but though not participating in the holy wars, the Icelanders had at this period an intimate connection with the European continent; and the disease of which we are speaking, when once introduced, would readily be kept up, partly by its contagious character, principally perhaps by the food and personal habits of the people. In the rest of Europe it has gradually disappeared, in consequence of the progressive improvement in the modes of living among every class of society.

* This Icelandic disease is said to be the same with the Elephantiasis of Cullen, the *E. legitima* of Sauvages; and agrees very exactly with that described by Dr. T. Heberden (Lond. Med. Trans. vol. i.) as occurring in the island of Madeira.

† Van Troil's Letters on Iceland.

The ravages committed by the small-pox in Iceland have been so much as to render this disease important even in the political history of the island. Introduced from the continent at different periods, and these in general distant from each other, it has spread rapidly, and under its most virulent form; producing effects almost unexampled in the history of this dreadful disease. The most remarkable instance of this kind occurred in 1707; during which year the mortality amounted, according to the most accurate estimate, to about 16,000 souls; more than a fourth part of the whole population at that period. Several similar instances are recorded in the history of Iceland, though none attended with effects so extremely disastrous. A few years ago the vaccine matter was introduced into this island from Denmark; but, owing to the smallness of the population, and its dispersion over so wide a surface, this was soon lost again; and, at the time of our arrival (in May 1810), we found the practice of inoculation (vaccination) entirely suspended. In contemplation of this circumstance, we had taken out with us a few vaccine crusts, with the design of recommending the method lately proposed by Mr. Bryce. Almost immediately on our arrival, we inoculated several children at Reikiavit, and afterwards in other parts of the country; and, having a communication with the landphysicus on the subject, we had the satisfaction of knowing, before we returned to Britain, that the vaccine crust had found its way into every part of the island. The adoption of the plan of inoculating from the crusts, will doubtless secure to the inhabitants a permanent continuance of this blessing.

The Icelanders have occasionally suffered much from the measles, as well as from the small-pox; in 1797 six hundred people were carried off by this disease.

Syphilis cannot be said to exist in Iceland. Single cases have sometimes occurred from communication with foreigners; but the disease has always been intercepted before it made any progress in the country.

Psora is an almost universal complaint in Iceland, appearing indiscriminately among all classes of the inhabitants. No discredit is attached to it, nor does it seem that any means of

cure are attempted, though the most efficacious remedy is found in so much abundance in the country.

Inflammatory visceral affections are very common among the Icelanders. The variable nature of the climate, and the constant exposure to wet and cold which is incurred in the occupation of fishing, give a strong tendency to pulmonary complaints; and, out of the annual number of deaths in the island, a very large proportion are referable to this cause. This fact was ascertained from the examination of certain statistical registers, which are annually drawn up by the priests of the several parishes, and transmitted to the bishop of Reikiavik. In these pulmonary affections, and especially in cases of phthisis, the *lichen icelandicus* is much employed by the natives; and possesses a reputation among them, which the experience of its effects in other countries would scarcely seem to warrant. As a demulcent remedy, however, it probably in some degree alleviates the symptoms; and, as an article of diet, in such cases its use may certainly be advantageous.

Inflammatory affections of the abdominal viscera are likewise very common among the Icelanders; chiefly, perhaps, in consequence of the peculiar nature of the diet to which they are accustomed. It is possible also that a disposition may be given to these complaints by the treatment of the children in their early infancy. A mother in Iceland seldom suckles her child; but nourishes it with cows' or sheep's milk, which the infant sucks from a piece of moistened rag, or a sponge. Where, from extreme poverty, or other circumstances, milk cannot be obtained, a little fish or flesh meat, rolled up in cloth and linen, and put into the infant's mouth, is the substitute most commonly employed. The diet of the Icelanders likewise gives much disposition to worms; and the ascarides are observed to be particularly frequent.

The climate and the occupations of the people, particularly that of fishing, render rheumatic affections very common. It is said that gout also occasionally occurs; but it may be doubted if it be not some modification of rheumatism which obtains this name.

Hypochondriasis is a frequent complaint among the natives of Iceland, induced probably by the physical circumstances of

their situation, and the long confinement to their habitations, which is necessary during the winter season. Yet the general temperament of the Icelanders does not appear to be a melancholic one, and the vivacity of their manner frequently forms a striking contrast to the wretchedness which their external condition displays.

Besides the diseases which have already been noticed, I had the opportunity, while in Iceland, of seeing cases of epilepsy, hysteria, amenorrhœa, menorrhagia, asthma, icterus, &c. No case of idiopathic fever, either intermittent or continued, occurred to my observation. With respect to intermittents, however, I was informed that they occasionally appear among the inhabitants under a well marked form; an effect, no doubt, of the vast extent of bogs and marshy ground, which are formed even in the most populous districts of the island.

A singular complaint remains to be noticed, the effects of which, though limited to a small spot, are eminently disastrous as far as they extend. This is the disease called *Ginklofe* by the Icelanders; the Tetanus or Trismus neonatorum of medical writers; which invades children at a very early age, and almost invariably proves fatal in its event. It occurs very rarely, if at all, on the mainland of Iceland; but is confined principally to the group of islands called Westmann-Eyar, situated on the southern coast.* The population of Heimacy does not amount at present to above two hundred souls, and is almost entirely supported by migration from the main land; scarcely a single instance has been known, during the last twenty years, of a child surviving the period of infancy. Dur-

* The Westmann islands consist entirely of lava. The nearest to the coast is about twelve miles distant; and the most remote about twice that distance. Only one of them, called *Heimacy*, is inhabited; and the people are by no means respected by their neighbours on the main land, who represent them as being remarkably indolent and depraved in their habits. Their food consists chiefly of fulmars and puffins (*Procellaria glacialis*, et *Alca arctica* Linn.), which are slightly salted and barrelled. This is the principal aliment of the people of St. Kilda, the most remote of the western islands of Scotland. The same peculiar and fatal disease attacks children in both places. Until the great volcanic eruption of 1783 took place, there was abundance of fish around the Westmann islands; but, since that period, the fishing on this coast is reported to be much less productive.

ing a great part of the year, the island is wholly inaccessible in consequence of storms, currents, and the nature of the coast. The inhabitants are therefore left almost solely to their own resources. The chief article of food is the sea-fowl, called *fulmar*, which they procure in vast abundance, using the eggs and the flesh of the bird, and salting the latter for their winter food. The destructive effects upon the fishery around these islands by the volcanic eruption of 1783, has deprived the inhabitants of this article of diet. Of vegetable food they have none; and there are only a few cows and sheep on the island.

The distressing consequences of this disease led the Danish government to give an official direction to the landphysicus of Iceland, to visit the Westmann islands, for the purpose of investigating its nature and causes. This gentleman went over to the islands during the summer of 1810, and remained three weeks on the spot. Though he did not himself see a case of the disease, he obtained all the principal facts connected with it from the priests, and those of the inhabitants who had had children. The symptoms of the complaint are briefly these. Very soon after birth, strabismus and rolling of the eyes are observed; subsultus tendinum occurs; and the muscles of the back are often drawn together and stiffened, evidently by incipient spasm. These appearances infallibly denote the approach and event of the disease. Having continued during a period varying from one to seven days after birth, trismus generally comes on, sometimes attended by opisthotonos, which is strictly called the *ginklofe*; occasionally with emprosthotonos, to which the name of *klums* is given by the natives. The trismus presently impedes deglutition, and, the paroxysms becoming more violent, the infant is carried off. When the rare event of a favorable termination occurs, it is portended by a critical diarrhœa, or by an exanthematous eruption, with the evacuation of the meconium.

The following table, which includes a period of twenty-five years, shews the mortality consequent upon this disease in the

Westmann islands; and exhibits the days also upon which death has happened.

Children.		Days.	Children.		Days.
1	. . . lived . . .	2	18	. . . lived . . .	9
3	. . . . .	3	10	. . . . .	10
14	. . . . .	4	2	. . . . .	11
16	. . . . .	5	1	. . . . .	12
22	. . . . .	6	1	. . . . .	13
75	. . . . .	7	5	. . . . .	14
16	. . . . .	8	1	. . . . .	21

It will be seen, from this Table, that the number of deaths on the 7th day greatly exceed those on any other; and also that they are more frequent on the 14th day, than on the days immediately preceding or succeeding it. From the proportion which these cases of fatal event bear to the whole population of the island, it is probable that few, if any, instances of recovery have occurred, during the period included in the Table. No methods of cure have hitherto been resorted to by the inhabitants.

This disease is well known to prevail in other parts of the world; and has been particularly described as it appears in the West Indies, and in the island of Minorca.* It exists also in Switzerland, and in some of the northern districts of Scotland; especially in the island of St. Kilda, the inhabitants of which, in their diet and mode of life, much resemble the natives of the Westmann islands. The exciting causes are involved in much obscurity. It may be presumed, however, that they must vary considerably, when the disease appears in countries so widely different, with respect to climate and the situation of the inhabitants. Its occurrence in the Westmann islands may reasonably be supposed to have some connection with the extraordinary diet of the natives; and this is the more probable, as it appears that the complaint has been much more frequent since their fishery was destroyed by the volcanic eruption in 1783. Independently of any effect which the peculiarity of the mother's constitution may have upon her offspring, the practice of given to the infant a strong and oily animal food

* Vid. Hillary, Chisholm, and Clarke, on the Diseases of the West Indies; and Cleghorn's Diseases of Minorca.

almost immediately after birth, will necessarily create irritation in the bowels, and dispose to spasmodic affections. Dr. Klog, in some remarks he gave me on this subject, attributes much to the effects of the sea air, and of a moist atmosphere; but, had these causes any considerable influence, we might expect that the disease would be more frequent in different parts of the world, than is actually found to be the case.

The age which the Icelanders usually attain, presents nothing remarkable in either extreme: from a table of population, it appears that in 1801, when the number of inhabitants was 47,207, there were 41 persons between the ages of 90 and 100; 443 between 80 and 90; and 1698 between 70 and 80. The number of females was 25,371: of males, only 21,746. The longevity of the females exceeds considerably that of the males; owing, no doubt, to their less exposure to the severities of labour, and the hardships of the climate. Of the 41 persons between 90 and 100, 35 were females; of those between 80 and 90, 285 were females, while the number of males was not more than 158. A comparison of facts would probably prove, that the longevity of the Icelanders rather exceeds, than falls short, of the average obtained from the continental nations of Europe.

The Icelanders are in general of a tall stature; arising, however, more from the length of the spine, than of the limbs: the head is of the middle size: the countenance open: the complexion exceedingly fair, and among the women often very florid. The hair is almost invariably of a light colour, and seldom curled. Corpulency is rarely observed among the natives of Iceland.—*Sir George Stuart Mackenzie's Travels.*

A case of Recovery from the Effects of Arsenic, with Remarks on a new Mode of detecting the Presence of this Metal. By PETER M. ROGET, M. D. Physician to the Northern Dispensary, and late Physician to the Manchester Infirmary, Dispensary and Lunatic Hospital.

[From the New London Medical and Physical Journal, for April 1812.]

THE white oxyd of arsenic, when taken in sufficient quantity, is in general so violent and so certain a poison, that the following instance of recovery, after many formidable symptoms had appeared, will, perhaps, be not unworthy of the attention of this Society; more especially as the plan of treatment that was pursued, has not, as far as I can learn, been hitherto put in practice under similar circumstances. A girl, 19 years of age, of a sanguine temperament and delicate constitution, having met with a severe disappointment, formed the resolution of putting an end to her existence. With this intent, on the 12th of February last, she purchased sixty grains of white arsenic, and leaving her house at eight o'clock in the evening, that she might execute her purpose unobserved, she strewed the powder upon a piece of bread and butter, and eat the whole. In about ten minutes after she had swallowed the last portions, an effort to vomit took place; but only a small quantity of the bread was rejected from the stomach; and, during the remainder of her walk, no further vomiting occurred.

About an hour after she had taken the poison, she returned home, and her sister, observing that she looked exceedingly pale, inquired if she was well. She made a sign that she felt very ill, and hastened immediately to her bed. She had not lain down above a few minutes, before she was seized with violent pain in the stomach, which was soon followed by severe vomiting. The vomiting was fortunately promoted by large draughts of warm water, with which her mother supplied her, but which it required much persuasion to induce her to take: they were returned almost as soon as swallowed. It was at this period that, from the extreme agitation and distress which the patient appeared to suffer, the idea first occurred to her mother of her having possibly taken poison; but the young woman, whenever

questioned on the subject. denied the accusation with vehemence. The vomiting continued to recur from time to time, and was attended with considerable griping in the bowels, and with copious watery evacuations by stool. The fluid that was vomited was of a yellow or greenish colour, and, on two occasions, was observed to contain a small quantity of florid blood.

The anguish of the patient had now risen to such a pitch, that her resolution gave way to the urgent wish for relief, and she acknowledged the cause of her sufferings. An apothecary in the neighbourhood was immediately applied to, and, at about one o'clock in the morning, she took, by his directions, five grains of sulphur made up into a pill, together with three spoonsful of a mixture of $\frac{3}{4}$ ss. of sulphate of magnesia, $\frac{3}{4}$ i. of carbonate of potass, and a grain of tartarised antimony in $\frac{3}{4}$ iii. of peppermint water. Of this mixture, three doses were taken in the course of the night, but none of them remained above a few seconds on her stomach. It is proper to notice, that some few hours afterwards, on emptying the vessel into which the patient had vomited, a quantity of white powder was found at the bottom involved in a glairy fluid. As this substance had been thrown away before I came, I had no opportunity of examining it.

About twelve o'clock on the following day (the 13th) the mother of this young woman applied to the northern Dispensary for assistance, and I went immediately to see her. She was suffering intense pain at the pit of the stomach, much increased by pressure, and accompanied with frequent retching, and occasional fits of vomiting. There was general tension over the abdomen. The face was flushed, the respiration hurried, anxious, and often interrupted by spasmodic catchings, approaching to hiccup. The pulse was 120, small, and extremely quick; the tongue white, but moist. The voice was tolerably firm, and the speech perfectly distinct and collected. I directed a vein to be opened in the arm, but could not procure a very full stream of blood. When about eighteen ounces had been obtained, the patient grew pale, complained of being sick, and vomited about half a pint of fluid of the appearance of thin gruel. Deliquium being at hand, the bleeding was stopped, and immediately afterwards the pulse ceased at the wrist, and the patient fainted. She remained about a quarter of an hour in a

state of insensibility; the pulse gradually returning, and beating 60 in a minute. In the course of an hour it had again risen to 120, but was much softer, slower, and more equable than before the venesection. The pain in the stomach was somewhat alleviated, and the sickness was entirely removed: the breathing was more tranquil; but the countenance continued exceedingly pale. The patient complained much of a feeling of excessive coldness, particularly in the extremities, although to the hand of another person, they appeared to be of the natural warmth. These sensations of chilliness recurred frequently in the course of the day.

I now ordered a large blister plaster to be placed over the region of the stomach.

I visited her again at five in the evening, along with my friend Dr. Marcet, and noted the following particulars. The pain in the stomach continues to be intense, and though it occasionally remits, at other times it returns with increased violence, and is attended with slight efforts to vomit: there is also much pain in the fore part of the head. She complains of a burning heat in the fauces, rendering deglutition painful; the mouth is clammy, and there is much thirst, although the secretion of saliva is considerable. The burning sensation descends into the stomach, and is diffused over the whole chest. The skin hot; the pulse 120, and wiry. Great uneasiness is felt on the approach of a candle to the eyes. The voice is stronger, and she appears to have, in a great measure, recovered from the sudden debility produced by the bleeding. But her mind is still agitated by the recollection of her misfortunes; and, notwithstanding the assurances that have been given to her, that the principal subject of her affliction would be done away if she recovered, she declares that her only wish is to end her anxieties in death. As she had no stool since the morning, I directed $\mathfrak{z}\text{i}$. of oleum Ricini to be given in divided doses.

At seven o'clock, she was seen by the apothecary of the Dispensary. He found her pulse at 140; she was anxious and restless; and conceiving that the blister plaster was the chief cause of her uneasiness, insisted on its being removed. In this wish she was indulged by her friends, who imagined that it was useless to torment her any longer. She complained of being very cold; and

on being raised in bed, that she might take some tea, suddenly fainted away, and continued in a state of syncope, with slight convulsions, for half an hour. When she came to herself, the Castor oil was given to her, and remained upon her stomach without exciting nausea. After this she had half an hour's sleep, but awoke with the pain as severe as before.

At eleven at night, I again called with Dr. Marcet. There have been more complete remissions of pain, tho' it is still occasionally violent, but unattended with any inclination to vomit. When severe, it is always relieved, and nausea repressed, by a draught of barley-water, of which fluid about a quart has been taken since six o'clock. In the intervals of pain, she is more tranquil, and much disposed to sleep. Her strength, however, appears to diminish: she has frequent hiccup, constant sensation of burning in the throat and stomach, and an extremely pallid countenance. The eyes are kept constantly closed from the uneasiness which light produces: the conjunctiva is pellucid, and the pupil contracts but slowly.

On calling the next morning (the 14th) at eight o'clock, I was told that at midnight she had had a violent attack of pain, and threw up about a tea cup full of fluid. Soon after this effort, the pain subsided, she became composed, and had three or four hours of continued and refreshing sleep. In the course of the night, she had a copious thin stool, in which globules of the Castor oil were visible. The blister has discharged abundantly. No appearance of buffy coat is exhibited by the blood drawn yesterday; the crassamentum is even softer than usual, and bears a large proportion to the serum. She is this morning quite free from sickness or pain in the stomach; takes tea and milk with relish; has more strength of voice, and bears the light much better than yesterday. The pulse is 112, and small. The colour has returned to her lips and cheeks: her spirits are revived, and she is now anxious to recover; a change that may partly be ascribed to fresh hopes having been held out to her, with respect to her future prospect in life, if she survived the effects of her rashness.

In the evening I found that no material change had occurred. She has had a strong disposition to sleep; but whenever it is indulged, she is disturbed with frightful dreams, and awakes

in much alarm. The least sudden noise occasions violent starting: the breathing is interrupted by frequent sighs, and involuntary catchings during inspiration. She has often the feeling of emptiness and sinking about the præcordia, which threatens syncope, and is generally relieved by taking liquids. The headach is distressing: the pulse 120, and soft: the skin somewhat hotter than natural. The ol. Ricini was ordered to be repeated, if she should have no spontaneous motion.

On calling early the next morning (the 15th), I found that she had passed a sleepless night; and that the headach, the oppression in breathing, and the sensation of sinking had considerably increased. At five in the morning, she took ℥i. of ol. Ricini, which in half an hour brought away a large quantity of feculent matter. She complains this morning, that the burning sensation of the throat, impeding deglutition, has returned; while at the same time, she has frequently the feeling of a stream of cold water running down the back. At times, darting pains are felt in the stomach, as if needles were passed through that organ. The pulse is 125, and very small: the tongue white, but not dry. There is a good deal of vertigo, and the eyes are again painfully affected by light.

Capt. statim aq. menth. pip. & mist. Camphor. fort. ana ℥ij. cum aq. font. ℥ss. et repetatur secunda quâque horâ.

On my visiting her at one o'clock, she expressed herself much relieved by the camphorated julep: all the symptoms were alleviated, and the appetite returned. In the evening she took another dose of Castor oil; the operation of which was speedy, but accompanied with sharp pains in the lower part of the abdomen.

On the succeeding day (the 16th) the symptoms still continued, but in a milder degree. She had slept the whole of the night: the pulse was 100, and tongue cleaner. The darting pains of the stomach still at times recurred, and were extending to the left side of the chest. The cough was frequent, but more loose. Cold shiverings were occasionally felt, together with aching pains in the extremities, and a sensation of tingling in the skin. There was a great disposition to start on any sudden impression. Her appetite being good, she was tempted to eat

some animal food at dinner. In the evening she was more hot and feverish, and the pain of the side had somewhat increased.

The next morning (the 17th) I collected the following Report. The night has been passed with but little sleep, much restlessness, and alternate states of cold and heat. The pulse is 112, of moderate quickness; the tongue is loaded with a white fur. The pain under the margin of the ribs on the left side is constant and severe, and much aggravated by the cough, which has increased in violence. The bowels are free from pain, and there is no longer any sensation of sinking and oppression about the præcordia. The thirst is urgent, as well as the burning sensation in the throat. The vertigo and headach still continue, together with the pains in the limbs, and tingling in the skin.

The camphorated julep was now discontinued; seven leeches were applied to the side, where the pain was most felt; and a blister ordered to be laid on the same spot, after the leeches had performed their office. An ounce of ol. Ricini was directed to be taken in the evening.

At eight o'clock P. M. the pain in the side was somewhat easier: the cough was attended with expectoration. There was much thirst and occasional chills, followed by increased heat: the pulse was at 108: and the Castor oil had operated freely.

R. Aq. ammon. acetat. \bar{z} ss. Liqueur. antimon. tart. \bar{z} i. Mucilag. acaciæ. Aq. menth. Syrup. comm. ana \bar{z} i. M. Capt. tertiis horis.

On the 18th, I learned that the pain and cough had increased in the fore part of the night, but were relieved on the breaking out of perspiration. The catamenia have made their appearance this morning. She has had a natural motion, has slept for above two hours since day-light, and finds herself at present considerably better. The pulse is 96, and soft. The expectoration is scanty and difficult.

Add. singul. dosibus mist. Oxymel. scill. \bar{z} ss.

On the 19th, I found that she had slept well the preceding night. She is this morning quite free from pain: the cough continues to be troublesome, but the expectoration is more free. She complains of being very weak, and has occasionally the sensation of emptiness in the stomach. At ten o'clock in the evening, after having exerted herself in conversation on sub-

jects in which she was deeply interested, she had a return of pain in the left side; and, about eleven o'clock, suddenly went off in a fit, during which she was completely insensible; the left arm and leg were agitated with strong convulsions: there was considerable foaming at the mouth, which was drawn to the left side, while the other features of the face were much distorted, and frequently convulsed. These symptoms lasted nearly two hours; and during the remainder of the night the patient continued insensible, with occasional moaning and twitching in the limbs.

In the morning (the 20th), I found her lying in a comatose state, with the eyes closed, unable to answer questions or perform any movement unless when strongly roused. The pulse was 92, soft, and of equal strength in both wrists. The bowels were sufficiently open; there was no difficulty in swallowing: the pupils were somewhat dilated, but contracted on the admission of light. She sighed and moaned frequently, but otherwise the respiration was tranquil. On inquiring if she felt any uneasiness, she complained of violent headach, and also of pain on the left side of the abdomen, nearly in the region of the spleen, and she could not bear it to be pressed. There were occasional tremors in the limbs.

Applicetur emplastr. lyttæ abdomini quâ dolet; & capt. sextis horis, mist. camph. & aq. menth. ana ʒvj. cum spt. ammon. aromat. gutt. xv.

The account I collected the next day (the 21st) was, that she had a convulsive fit last night of the same kind, and occurring at the same hour as the preceding; and that she had continued since in a state of torpor. The bowels are regular. At two o'clock, P. M. of the same day, she was considerably revived; there was no longer any intolerance of light, and every uneasy sensation, excepting that of weakness, had vanished. The pulse was natural; the tongue nearly clean. In the evening she had some return of pain in the abdomen, but in a lower situation than before, and it was still accompanied with great tenderness on pressure. The part to which the blister plaster had been applied was free from pain. Relief was experienced from the mixture, which procured a discharge of flatus from the stomach.

Feb. 22. The convulsions did not return in the night, but at

eight this morning, she was attacked with a fit, which lasted till twelve. From this fit, her recovery, which happened in my presence, was more sudden than before. She seemed to awake from a sound sleep; she declared that she felt perfectly well, and was desirous of getting up and taking food. Her only complaints were of violent itching of the skin over the whole body, and of slight vertigo on attempting to sit up. In the evening she fell asleep, and soon after had a return of convulsive motions, which continued at intervals, during the greater part of the night. They were less violent, but more continued, than during the preceding day.

On the morning of the 23d, she made no complaint except of headach, itchiness of the skin, and burning sensation in the throat. The convulsions returned with violence about noon, and continued for an hour and a half: they no sooner ceased, however, than she again awoke free from complaint, excepting a violent itching of the nose, and a numbness in three of the fingers of the right hand.

On the 24th, and for several succeeding days, the convulsions still returned during sleep, but they gradually became milder, and at length amounted only to irregular twitchings of the tendons. On the 31st, these had entirely left her. The strength had in the mean time been improving, and the only symptoms which remained, were occasional flatulence and oppression of the stomach after meals; and sometimes dyspnœa, and a sense of pain and constriction across the lower part of the thorax. With the assistance of some antispasmodic medicines, these symptoms have been much relieved, but they are still apt to recur on any agitation of mind. Her natural appetite has returned, but she remains much thinner, and has by no means recovered the same degree of health and strength that she enjoyed before her desperate attempt upon her life.

In reasoning upon the phenomena recorded in the preceding narrative, many topics of inquiry might be suggested, and various conjectures formed as to the morbid states corresponding to each train of symptoms. But I shall not trespass upon the time of the Society any further than to state my ideas on the different conditions through which the patient passed, and

the views which led me to adopt the mode of treatment that was employed.

The case before us affords a proof of the possibility of recovery when an unusually large quantity of arsenic has been swallowed, and under very unfavourable circumstances: and it also furnishes arguments in favour of a mode of practice directed to the removal of the effects of the poison, when it would be in vain to attempt its immediate evacuation or destruction. The protracted nature of the case gives us the opportunity of observing distinctly the peculiar train of symptoms that are excited by this powerfully deleterious agent, and which are either obscurely discernible when a smaller quantity has acted upon the system, or confusedly blended together in those instances which run through a more rapid course.

We may remark, that the first operation of the arsenic, was that of a violent emetic and purgative; and to this circumstance I am inclined to think the patient owed her only chance of safety. These corresponding effects began to take place about an hour after its reception into the stomach, and were promoted by copious dilution, by which I should imagine that nearly the whole of the poison was evacuated. It appears, indeed, from the testimony of a number of authors,* that a few grains are in general sufficient to occasion death: had any considerable portion of the sixty grains, therefore, remained longer upon the stomach or intestines, the consequences would have been irretrievably fatal. From the analysis of the fluid vomited at the time I first saw the patient, and of which I shall afterwards give an account, it would appear that none of the arsenic was at that time present in the stomach.

But the impression which the poison had made upon the coats of the stomach, was not of a nature to subside on the removal of the cause that had produced it.† The inflammation

* See Dr. John Johnstone's Essay on Mineral Poisons, p. 21.

† This point is sufficiently established by the experiments of Dr. Bostock, which were made on the occasion of a remarkable trial for murder at Lancaster, and which are related in a pamphlet, entitled, "A Vindication of the Opinions delivered in Evidence by the Medical Witnesses for the Crown, &c. Liverpool, 1808;" and of which a further account is given in the Edinburgh Med. and Surg. Journal, vol. v. p. 14. Two dogs were killed by receiv-

excited in that organ, and the symptoms of which, at the time I first saw the patient, were strongly marked, would probably, if left to its natural course, have run through all its stages, and terminated in gangrene. I considered that dilution had been largely employed, and that the evacuations from the stomach and intestines had been abundant. The stomach was in so irritable a state, that no medicine could be exhibited with any prospect of advantage. I concluded that the principal and more immediate source of danger, consisted in the inflammation of the stomach; and viewing the matter in this light, was induced to adopt the treatment proper for idiopathic gastritis.* The bleeding was pushed to deliquium; a large blister plaster was applied to the epigastric region, and the bowels kept open by frequent doses of oleum Ricini. The employment of these remedies was productive, indeed, of great debility, which, however, was but temporary: the advantages procured were more permanent; these were the occasional remission of the pain, and the immediate cessation of the vomiting, which never afterwards returned, excepting once in the course of the following night. An effectual check was given to the inflammatory process; and a remission of the symptoms was obtained for about thirty-six hours; during which the system showed a tendency to return to its natural condition.

ing a metallic poison into the stomach, although the whole of the poisonous substance, as far as could be ascertained by the nicest chemical tests, had been evacuated previous to death; and dissection showed marks of inflammation in the coats of the stomach and intestines. I had an opportunity of observing a fact of a similar kind in a girl who was brought into the Manchester Infirmary, after having swallowed a large quantity of corrosive sublimate. I could not discover any of the metallic salt in what she had vomited, twenty-four hours after the poison was taken. She lived for ten days. I examined with great care the state of the *primæ viæ*, and although marks of high inflammation were visible in the stomach and duodenum, I could discover no traces of mercury in their contents, nor of any portion adhering to their inflamed coats.

* Since this paper was written, I have found that the employment of copious blood letting, in cases of poison from arsenic, had already been suggested by Dr Yelloly, on the principle of removing inflammation. "Analogy," says he, "seems to indicate its employment; but its particular fitness can only be determined by experience." *Edinburgh Medical and Surgical Journal*, vol. v. p. 393. I believe the case I have related is the first in which the experiment has been tried.

To this state of comparative convalescence, there succeeded a new train of symptoms, threatening danger of a different kind, but of no less magnitude than the former. These were of a nervous nature, apparently resulting from the sedative action of the poison upon the nervous system. To this cause may be referred the sense of coldness and numbness over the body, of void in the stomach; the somnolency, the severe headach, the tremors and convulsions; the anxiety, and constant tendency to fainting. These, conjoined with the deadly paleness of the countenance, inspired me with apprehensions that nature would sink under the struggle. Assistance might have been afforded by stimulant remedies; but these were contra-indicated by the presence of many symptoms of irritation in the throat and primæ viæ, by the sensation of burning heat in these parts, by the hardness of the pulse, and occasional sharp pains in the region of the stomach, which implied that a disposition to inflammation still existed. I therefore ventured only upon small doses of camphor with peppermint-water; and from these medicines relief was evidently experienced.

In the course of a day or two, the above-mentioned symptoms had subsided; but it was only to give place to another state of diseases of as formidable a kind. The pain in the stomach had gradually extended to the lungs, and was now accompanied with all the characters of pneumonic inflammation. Notwithstanding the exhausted condition of the patient, I had again recourse to the antiphlogistic treatment, conjoined with diaphoretics, and with the same success as before. The pneumonia was subdued, and weakness was all that remained.

It might now have been presumed that no further obstacle to recovery would arise, and that the arsenic had exhausted its power of doing mischief. The fallacy of such expectations was soon apparent. It was still lurking in the system, although some days elapsed without its exhibiting any marked effect. On a sudden its activity was again exerted, and a new order of symptoms of the convulsive kind were excited. The fits were completely epileptic, and were accompanied and followed by insensibility, which, in the beginning, was of such long duration, as to excite fears for the event. These apprehensions were dissipated by the fits becoming every day shorter, and the reco-

very from each more rapid and complete. In the course of a week they had entirely ceased, and the patient has since remained free from any urgent complaint; although the constitution has evidently been injured by the deleterious influence of the poison.

It will be seen, by referring to the history of the case, that most of the symptoms which are enumerated by authors, as the ordinary consequences of arsenic, were exemplified in the present instance. There are, however, some which appear to me to deserve particular notice, as I have reason to believe they are of unusual occurrence. These are, first, the severe pain in the forehead, which distressed the patient during several days: secondly, the great intolerance of light, that prevailed when the headach was most intense: thirdly, the various inflammatory affections of some of the viscera in the neighbourhood of the stomach, such as the lungs and spleen, which seemed to be secondary effects of the original affection of the stomach: and, lastly, epilepsy. This last disorder I do not find mentioned by any author that I have consulted, as one of the secondary effects of arsenic; convulsions being only noticed among the violent primary symptoms which lead to a speedy death.*

I shall beg leave to subjoin a few observations on the method of analysis that was employed, with a view of determining whether arsenic was contained in the fluid that was rejected from the stomach of this patient at the time that I first saw her. Dr. Marcet was so obliging as to assist me in this inquiry, and to him I am chiefly indebted for the following particulars.

The fluid, by being at rest for two or three days, had spontaneously separated into a thick mucilaginous sediment, and a clear supernatant liquor. The latter was filtered, and concentrated to very small bulk. It was then of a brownish hue, and manifestly acid. The application of the usual fluid tests, namely, of water impregnated with sulphuretted hydrogen gas, and of sulphate of copper, with the previous addition of carbo-

* Morgagni De Sedib. et Caus. Morb. LIX. 4. Lieutaud Hist. Anat. Med. Tom. 1. Obs. 154. Gmelin Apparat. Medicam. Vol. 1. p. 253. Epilepsy is sometimes a consequence of the poison of lead. It is mentioned as such by Dr. Warren, in the Medical Transactions, Vol. ii. p. 86; and also by Sir George Baker, Ibid. iii. 412.

nate of soda, did not give the slightest indications of the presence of the suspected metal. The thicker part of the contents of the stomach, evaporated to dryness, and thereby reduced to a spongy coaly mass, burned without emitting any arsenical fumes.

The negative conclusion, deducible from these experiments, is still better established by the result of our trials with another test, which occurred to Dr. Marcet while engaged in the examination of the substance in question, and which I am happy in having this opportunity of communicating to the Society. Let the fluid, suspected to contain arsenic be filtered: let the end of a glass rod, wetted with a solution of pure ammonia, be brought into contact with this fluid; and let a clean rod, similarly wetted with a solution of nitrate of silver, be brought into contact with the mixture. If the minutest quantity of arsenic be present, a precipitate of a bright yellow colour, inclining to orange, will appear at the point of contact, and will readily subside to the bottom of the vessel.*

In examining the circumstances attending the agency of this test, the following particulars were observed. On adding successively ammonia and nitrate of silver to distilled water, no precipitation takes place. Fowler's arsenical solution affords a precipitate of a yellow colour, similar in appearance to that produced by a solution of the white oxyd; but a solution of arsenic acid gives a precipitate of a red brick colour. The fixed alkalis, when substituted for ammonia, likewise produce a yellow precipitate; but the results are less distinct, since, in the circumstances in which the experiment is made, they decompose the nitrate of silver, an effect which ammonia does not produce. We found by comparative experiments, that the precipitates thrown down by the same re-agents, (namely, ammonia and nitrate of silver,) when either zinc, iron, copper, mercury, or lead was contained in the fluid, had an appearance totally different from that produced by arsenic; and that the latter could

* As this precipitate is soluble in ammonia, particular care should be taken to avoid adding it in excess; indeed, the quantity of either ammonia or nitrate of silver employed, can scarcely be too small for the purpose of detecting the presence of arsenic.

readily be detected by the same means, notwithstanding the presence of these metals. The salts of copper or lead, when previously mixed with a solution containing arsenic, occasioned no difference in the results. With a solution of oxymuriate of mercury, ammonia alone will occasion a white precipitate; but if arsenic be also present, on the addition of nitrate of silver, the precipitate immediately acquires a yellow colour. The efficacy of this compound test is not weakened, but, on the contrary, seems to be rather increased by the presence of sulphate of iron. Sulphate of zinc was not found to interfere with its operation, any otherwise than requiring a larger quantity of ammonia, in order to saturate the sulphuric acid; but when this has been effected, and the whole of the zinc precipitated, the addition of nitrate of silver produces the same yellow tint as in the other experiments. There is, therefore, reason to presume, that no admixture of metallic or other salts, will occasion ambiguity, or enable the arsenic to escape detection, when the above test is properly applied.*

Being curious to determine the limit of minuteness in the quantity of arsenic discoverable by this test, we dissolved a grain of white arsenic in a known quantity of distilled water, and by successive additions of water to determinate portions of this solution, prepared other solutions, containing respectively $\frac{1}{20000}$, $\frac{1}{200000}$ and $\frac{1}{2000000}$ of their weight of arsenic. By applying the test to a small quantity in a watch glass, we found that when it contained only one 25,000th of a grain of arsenic, the precipitate was of a bright yellow colour. It was still distinctly yellow when the quantity of arsenic was reduced by dilution to one 50,000th of a grain. When further diluted, the yellowness was gradually less and less discernible, and the precipitate appeared of a light blue. It retained this colour until its quantity became too minute for

* In referring to the different tests that have been recommended for the detection of arsenic, Dr. Marcet pointed out to me a paper, published in the Philosophical Magazine, for May, 1809, in which Mr. Hume has proposed boiling the suspected matter with a solution of carbonate of potash, and bringing into contact with it a stick of dry nitrate of silver; a method of proceeding, which is somewhat analogous to the one I have described, but which appears much less convenient in its practical application. See Henry's Experimental Chemistry, Vol. ii. p. 389.

observation. A blueish cloud was, however, very distinctly visible when the fluid examined contained only the 250,000th part of a grain of arsenic.*

If, along with the extraordinary degree of delicacy of this test, we take into consideration the extreme facility of applying it, and the greater convenience of operating upon fluids than upon solid bodies, as we are obliged to do when we have recourse to the usual methods, it appears decidedly entitled to preference. I would, therefore, wish to point it out as deserving the attention of analysts, whenever the existence or the absence of arsenic in any substance is the object of their research.

*An Instance of an entire Want of Pulsation in the
Arteries of paralytic Limbs.*

BY JOHN STORER, M. D.*

[From the New London Medical and Physical Journal, for August 1812.]

THE following case is rendered remarkable by the occurrence of a pathological fact, of a nature so curious, as to have called forth my observation to every circumstance connected with it.

Mrs. N——, a married lady, upwards of 50, and very corpulent, who had borne children, but ceased to menstruate several years, was taken in the last week of March, 1811, with symptoms of a fever of the mildest kind. These consisted chiefly of aching of the back and limbs, wandering pains in different parts of the body, a sense of general debility, heat,

* Dr. Bostock, in instituting a comparison between the different methods hitherto recommended for detecting minute portions of arsenic, says, that "he has no hesitation in giving it as his opinion, that the most convenient, the most delicate, and the most decisive process, is the one in which the green precipitate is formed by the addition of the sulphate of copper." And he states it as the result of his endeavours to discover the degree of minuteness to which this test is capable of being carried, that it could detect arsenic when it formed one 2400th of the weight of the fluid. *Edinburgh Med. and Surg. Journal*, Vol. V. pp. 174 and 170.

* Extracted from the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, pp. 448. Read July 2, 1811.

and a pulse about 84 in the minute, exceeding its usual standard by 14 or 15; there was neither chilliness, headach, nor much thirst. After a few days, the fever had remissions, and the exacerbations were followed by sweating. In this way the fever continued till the 9th of April, when, the window of the bed-chamber having been left open the preceding night, during a severe frost, and while the patient was in a state of perspiration, she complained of frequent coughing, and of a considerable degree of pain in the right side of the chest. On the 10th, these symptoms were increased, and were accompanied with a bloody tinge in the expectoration, and a pulse about 90, distinct and full. After a copious bleeding, a blistering plaster to the pained part, and a continuance of saline medicines, which, from the commencement of the disease, had kept the bowels freely open, I found her on the 11th, without pain, or very nearly so. Her pulse was reduced to 80; the expectoration was free, but still had a bloody tinge, which continued for a few more days. On the 12th, 13th, and 14th, she seemed, to herself and to her attendants, to be gradually improving; she was able to sit up for five or six hours at a time, and her appetite began to return.

Early in the morning of the 15th, after a disturbed night, she was suddenly seized with an excruciating pain in the left shoulder, extending nearly to the elbow, and, at the same time, with a paralytic affection of the whole left side, but without any corresponding affection of the face or speech, or any disturbance of intellect. When I visited her at one o'clock of the afternoon, I found that the pain, after the application of warm flannels, had removed from the shoulder into the left leg, below the calf, and into the foot, where it continued with so much severity, as to produce frequent screaming. The hand and arm affected felt colder than natural to my touch. She had some capacity of moving the shoulder, but could scarcely move the fore-arm or hand. The left thigh and leg were in the same paralytic state, possessing a very obscure degree of sensation and motion; but the hand and foot were insensible even to the prick of a needle. So far this attack, except in respect to the pain in the parts, had nothing singular in it, bearing the character of an imperfect hemiplegia,

such as usually occurs where no apoplexy has preceded. On laying my finger on the left wrist to examine the pulse I was the more surprised to perceive no trace of pulsation, as the situation and size of the radial artery were quite familiar to me, having uniformly ascertained the state of the pulse in the left arm, at each of my visits during this illness, and having uniformly found the pulsations full and distinct. As this was the arm from which blood had been taken on the 10th, I requested to examine it at the elbow, suspecting that the ligature might have been left, and was so tight as to compress the artery; but there was no ligature, nor could any pulsation be discovered at the usual place where I knew the artery lay. For it happened that, at the patient's request, I had examined the part at the time I prescribed bleeding, to satisfy her mind that her corpulence would be no bar to the safety of that operation. I then made a similar examination at the axilla, and was convinced that the pulsations of the artery of the paralytic arm, from the axilla downwards, were quite extinct. To complete my surprise at a circumstance so new to me, I perceived the subclavian artery of the same side to beat distinctly, at 104 in the minute. I also ascertained this to be the real state of the pulse in the right radial and temporal arteries; and in all of them the beats were as full and distinct as in health. The singularity of this symptom led to an immediate examination of the left thigh and leg, and I was unable to perceive any trace of pulsation either at the ham or groin.

In a patient of such corpulence, it would be presumption in me to assert the entire absence of pulsation in the crural artery, with the same certainty that I am able to affirm it in the arm; and I am the less disposed to do this, because the arm was, at this time, considerably colder than any part of the lower limb.

It happened fortunately, that Mr. Basnett, the surgeon who attended the family, was present during this examination, and immediately satisfied himself, at my request, of its accuracy. Exclusively of the severe pain felt in the leg and foot, the patient complained of a sense of fullness and confusion, with obscure pain in the forehead. A dozen leeches were therefore directed to be applied to the temples and forehead, and warm

fomentations, to be followed by a stimulating liniment, were to be frequently rubbed on the paralytic limbs, particularly the leg and foot, so long as the pain continued. Pills containing calomel were administered, and a saline opening draught was directed to be taken every six hours.

On the 16th, I found that the leeches had occasioned a bleeding, and that complete relief from the disagreeable sensations and pain in the forehead had followed. The severe pain in the left leg and foot had abated the preceding evening, the bowels had been freely opened, and my patient expressed herself with great cheerfulness, at having passed a good night, and being in all respects much better. She could move the fingers of the left hand, although partially, and with some difficulty; the arm was moved with more ease, and she thought the feeling in it was more natural. The state of the leg was also improved, but she had little, if any, power of moving the foot. At this time she had no consciousness of general illness; her whole solicitude was directed to the recovery of the use of her limbs, and to the uneasiness she suffered from a sense of coldness in the arm, when exposed to the air, and which she therefore required to be kept constantly covered with flannels heated, or wrung out of a hot fomentation. The temperature of the arm, to my touch, was evidently lower than that of the rest of the body, although this did not perceptibly exceed the natural standard.

In respect to the pulse, every circumstance continued as on the day before. The same examination, made and repeated with attention, gave the same results. The right radial artery beat 104 or 5 with regularity and distinctness; so did the left subclavian; but in the course of the artery of the left arm no pulsation could be discovered, nor in the corresponding leg and thigh. Pills of rhubarb with ammonia were prescribed to be taken with the former draught; a blistering plaster was applied to the inside of the left leg, and the fomentation and liniment were continued.

On the 17th, there was an evident improvement, both in the motion and sensation of the paralytic limbs; the pulse at the right wrist beat as on the preceding day, but, in the left, all pulsation was as completely extinct as hitherto.

On the evening of the 18th, I found my patient still improving, particularly in the power of moving the affected parts. She had passed a quiet night, and perspired freely, except in the left arm, which continued colder than natural. The state of the lower limb, in respect to perspiration, could not be judged of, as it was generally covered with a warm fomentation. On this day she complained of acute pain on the inside of the left foot, and as she had experienced an attack of inflammation, which was considered as gouty, in one of her feet about six months before, she expected that this would prove a return of it; but there was neither swelling nor discoloration, and the pain disappeared the next day. Her bowels were, by the use of the last medicines, kept sufficiently open; her urine was in due quantity, and of a natural appearance. Her head was perfectly relieved; but the pulse at the right wrist still beat from 104 to 106 in the minute distinctly. This was so much beyond its natural standard, as to indicate some causes of internal irritation. She had, however, no constitutional complaint, except some remains of the cough and expectoration, which had come on in the preceding week. She had taken sufficient nourishment on the day before, without inconvenience.

An attentive examination of the artery, at the axilla, elbow, and wrist of the left arm, and of the arteries in the corresponding thigh and leg, ended, as before, in there being no perception of pulsation at any of those parts where it ought to have been felt. The pulsations of the left subclavian artery, which, on the 17th, were distinct, and synchronous with the right radial artery, were on this day felt less distinctly, although they might still be numbered. Mr. Basnett had visited the patient on both days, and made a report altogether corresponding with my observations.

On a deliberate review of the case, at this stage of it, I confess, that I felt myself under no small embarrassment, in regard to the expectation that might be formed of its final result. A familiar acquaintance with morbid appearances, for upwards of forty years, had furnished me with no instance of the cessation of pulsation in a paralytic limb; and I was unable to calculate its consequences. It was evident from the temperament,

and the natural hue of the skin of the affected arm, which was entirely free from swelling and vesication, that a certain degree of circulation subsisted; and flattered by a daily advancement in the motive and sentient powers of the limbs, I had hitherto indulged the hope, that, at each successive visit, I should have the satisfaction to discover a return of pulsation. The evident failure in the power and distinctness of pulsation in the left subclavian artery, which now appeared for the first time, damped these hopes. Still, my patient possessed her accustomed energy of voice and manner, and there was no other symptom that threatened life. The blister on the leg had risen well, and was healing with a good aspect. The plan of treatment was directed to be continued.

On the 19th. I visited Mrs. N. at one o'clock, P. M. and at my own request, was met by M. Butlin, Mr. Basnett's partner, who had not seen Mrs. N. during this illness. We entered successively upon a new and minute examination of the pulse. The pulsations at the right wrist were distinct, but more frequent, by two or three in the minute, than at any former period of the illness; those of the left subclavian artery had become so indistinct, that no account could be taken of them. Mr. Butlin could not be assured that he had felt them at all; but he was quite decided, that there was no pulsation in any part of the left brachial artery, or in the artery at the left ham.

Our patient had received us cheerfully, and spoke with energy and much satisfaction of the improvement in the limbs, which was indeed very considerable. She could now move the foot in all directions, with ease and rapidity, and support herself on the limb when out of bed. She had so far recovered the perfect use of her hand, as to be able to squeeze my finger with considerable force; the sensation was also more natural, although the whole arm was still too cold, both to her own feeling, and my touch. She had, however, become evidently more irritable and unquiet, requiring frequent change of posture. About the middle of the preceding night, she had begun to be affected with a kind of suspirium, or sob, which she compared to that produced by being plunged into a cold bath; this attacked her whenever she was dropping asleep, and aroused her with the alarm of immediate suffocation. She referred this

sensation to the region of the mediastinum; but, as soon as she was completely awake, it went off, and she was not sensible of any difficulty of breathing in the intervals. I observed, however, that her respiration was shorter and more hurried than hitherto, and that her countenance expressed more anxiety. Pills of rhubarb and squill were prescribed to be taken with the former draughts, and a blistering plaster was applied over the sternum. Soon after we quitted her, the restlessness increased, with occasional returns of the feeling of suffocation. She passed a very unquiet evening, being frequently taken out of bed, and expired at two o'clock in the morning of the 20th, while her attendants were in the act of assisting her into bed. As soon as the issue of this singular case was known, application was made for leave to inspect the body, which was refused.

On reviewing the history of a disease, involving a phenomenon so extraordinary, as the absence of pulsation in the principal artery of a paralytic limb, it is to be lamented, that we are deprived of that light, which an accurate inspection of the body after death might have afforded.

It seems to me, that there are but two hypotheses, upon which any rational conjecture can be founded, to account for the absence of pulsation in the arteries of a paralytic limb. The first of these is, that there exists some obstacle to the course of the blood in the arterial tube, arising either from a disease of the tube itself, or from some compressing power, acting upon it externally. It is impossible, however, in the case of Mrs. N——, to imagine any such cause, capable of exerting its influence at once on the brachial and crural arteries of one side, and on them only. But if the want of pulsation had even been confined to the upper extremity, any obstructing cause, acting within, or upon, the artery of the arm, to be consistent with the circumstances of the case, must have existed in some point between those parts of the artery, denominated subclavian and axillary, and there was certainly no external appearance to justify such a supposition. Neither would it account for the gradual failure of the pulsations of the subclavian, during the two last days of the disease. But, to this account of the matter, there is another, and to my mind a more weighty objection. There is positive evidence that the

cessation of pulsation in the arm took place within a few hours before or after the attack of hemiplegia; and this being proved, it seems fair to presume, that the two circumstances were connected. As experience is in this case out of the question, it would be extremely difficult to imagine any mechanical cause arising so suddenly, and of a nature so powerful, as to impede the flow of blood, without manifesting itself by some external appearance.

The other hypothesis is, that although it is admitted to be true, that the vital organs are generally exempt from the effects of paralysis, yet it seems more than probable, that, in certain rare instances, the arteries themselves are susceptible of palsy. If this notion should be thought admissible, it would at once give a complete explanation of all the phenomena, and would be equally applicable to the condition of the arm, whether we suppose the pulsations of the lower limb to have been obliterated or not.

If it be objected as an inconsistency in this hypothesis, that supposing a paralytic affection of the artery of the arm, depending on the same cause, and occurring at the same time, as that of the voluntary muscles, it seems wholly unaccountable, that the sensation and motion of the affected limbs should be gradually restored nearly to a perfect state, whilst the arterial palsy increased, so as finally to prove fatal; I may plead, in answer, the mystery which to this day, involves all those changes in the animal frame, that are known to depend upon the condition of the nervous power, and may add, that the nervous energy in the organs of vital motion is governed by laws, entirely distinct from those that guide the voluntary muscles.

Nottingham, June 26, 1811.

P. S. I flatter myself I may be indulged in annexing to this history a brief account of a case, which happened several years ago, but has only of late come to my knowledge. It has since been recounted to me by Mr. Vickers, surgeon, of Loughborough, who attended the patient, with a readiness and distinctness, which proved the deep impression it had made on his mind.

Mr. Lockwood, a farmer, of Barrow, in Leicestershire, about 60 years of age, remarkable for no peculiarities of constitution or habits, returned one morning from his accustomed ride round his farm, to breakfast with his family, at eight o'clock, in perfect health. Before he had finished, the hand which held the tea-cup, then at his mouth, dropped lifeless on the table. His observation was, "I do not feel ill, but this must be of consequence; let Mr. Vickers be sent for immediately." When Mr. Vickers arrived, which was within two hours after the seizure, he found the arm completely paralytic, and colder than natural. On examining the wrist, he could feel no pulse; neither did it ever return. The pulse in the other arm was still in a natural state, the beats being distinct, and not exceeding in frequency the healthy standard. He affirmed that he had no complaint to make, but the loss of the use of his arm. Mr. Vickers employed hot fomentations, stimulants, and friction, in the hope of restoring vitality to the affected limb, but without the least success. Its colour, which at first was only too pale, soon grew dusky, and this dingy appearance increased hourly, but without swelling or vesication. About four hours after the attack, his constitution showed signs of becoming affected. He complained of faintness and perspiration; the pulse was accelerated; his respiration grew frequent; and, at length, somewhat interrupted and laborious. Such was the rapid progress of the symptoms, that the surgeon did not leave him till he was in the act of breathing his last, which happened within six hours from his first seizure.

I will not multiply observations on this case, since, in it too we are deprived of the advantage, which might have arisen from dissection. Suffer me only to observe, that if this is to be considered as a case of spontaneous gangrene, it bears no resemblance to any that has occurred within my observation, or that I have ever seen described. Some examples of very rapid and fatal gangrene might be quoted, but none, I believe, where the sensation and motion of the part were previously and suddenly destroyed. If such were to be found, I should be disposed to consider them in the light that I view this, as instances of complete palsy, affecting equally the muscles and arteries of the limb, and proving so speedily fatal, because the

influence of a paralysis in this degree, on parts essential to life, may be reasonably supposed to be inconsistent with its prolongation.

After the preceding cases were read to the Society, Dr. Wells mentioned, that a similar one, with respect both to the principal symptoms, and termination, had been related to him by the late Dr. G. Fordyce, who had seen it along with Dr. Sequeira. At the desire of the Society, Dr. Wells afterwards applied to Dr. Sequeira, who was in consequence so kind as to furnish him with extracts from the notes which he had taken of it. From the information received in this way, and the communication of some additional circumstances, by an intimate friend of the deceased person, the following account has been compiled.

Mr. J. S——, an eminent merchant, aged 62 years, tall, of a ruddy complexion, and inclining to be corpulent; in general healthy, but subject to a cough and difficulty of breathing in the winter. One morning, in December, 1801, a few hours after the commencement of a great thaw, as he was proceeding on foot from Highgate to London, with a pair of tight boots on, came to a considerable puddle of water, to pass which, he jumped from a bank on one side of the road to a piece of hard ground. He felt immediately a disagreeable jar through his whole body, and was a little stunned, but did not fall. In a minute or two he was able to continue his walk to town, where he did his usual business that day, both in his Compting House, and on Change. On the evening of the following day he complained of a pain in his right foot, which a surgeon, whom he consulted concerning it, attributed to a sprain occasioned by his leap. About a week after, his right leg was attacked with pain and swelling; these symptoms were ascribed to gout, under which, or something like which, he had once formerly laboured. A pain in his lower belly soon followed, which went away, after his taking some opening medicine, and never returned. His winter cough, and difficulty of breathing, now came on; and as he found that they were more troublesome when he lay down than when he sat up, he used a bed-chair,

to enable him to sleep with the trunk of his body nearly erect. While things were in this state, he awoke one morning with an excruciating pain in his left arm; this was supposed to have arisen from the pressure of the bed-chair, which was too small for a person of his size. In the afternoon, the same arm became numb and motionless, immediately upon which the pain ceased. About the same time, the pain and swelling in the right leg disappeared. At the first visit which Dr. Sequeira made after the occurrence of the palsy, he was surprised to find, that no pulse could be felt in the paralytic limb. He was well acquainted with the patient, and had often felt the pulse before in both wrists. Being now very much alarmed, he requested that Dr. Fordyce might meet him in consultation. There were however, no other symptoms of danger than what were furnished by the state of the left arm; for the pulse in the arm was natural, in regard both to frequency and force; the patient was in good spirits, and in perfect possession of his mental faculties; and the skin of the affected limb retained its healthy colour, and, to the feel of Dr. Sequeira, its usual heat. When Dr. Fordyce saw the patient, he apprehended the approach of mortification, and advised the adoption of measures to prevent it. For two days no further alteration took place. On the morning of the third day, Mr. S. rose from his bed, in order to make use of a close-stool, which was in his bed-room; but before he could reach it, he was seized, according to the report of his nurse, the only person with him at that moment, with convulsions, and in a few minutes expired. The friend, however, of whom mention was formerly made, has told Dr. Wells, that he saw Mr. S. a minute or two before he died, as he happened to be in his house at the time he so suddenly became worse, and that he was then neither agitated in his limbs, nor discoloured in his face, but seemed to be in a faint.

The paralytic arm was examined on the following day by an excellent anatomist, who was unable to discover any organic disease in the bloodvessels, or any other part of it. The relations would not permit him to open the head, thorax or abdomen.

Dr. Wells also recollects Dr. Fordyce's mentioning, that he had ascertained, by an experiment, that notwithstanding there was no pulse in the left arm, the blood still moved

through its arteries and veins. The experiment, Dr. Wells thinks, was the following: he compressed a large vein of the arm with one of his thumbs, and, with the other, forced upwards the blood contained in an inch or two of the same vein immediately above the compressed point. The part of the vein lying between the two thumbs being now empty, he lifted the lower one, and instantly the portion of the vein, which had been empty, became full.

Observations and Experiments on Vision.

BY WILLIAM CHARLES WELLS, M. D. F. R. S.

[From Nicholson's Journal, Supplement to Vol. XXXI.]

I. I WAS consulted, in the beginning of the year 1809, upon a disease of vision, which, as far as I know, has not hitherto been mentioned by any author. The subject of it was a gentleman about thirty-five years old, very tall, and inclining to be corpulent. About a month before I saw him, he had been attacked with a catarrh, and, as this was leaving him, he was seized with a slight stupor, and a feeling of weight in his forehead. He began at the same time to see less distinctly than formerly with his right eye, and to lose the power of moving its upper lid. The pupil of the same eye was now also observed to be much dilated. In a few days the left eye became similarly affected with the right, but in a less degree. Such was the account of the case, which I received from the patient himself, and from the surgeon who attended him. The former added, that previously to his present ailment his sight had always been so good, that he had never used glasses of any kind to improve it. On examining his eyes myself, I could not discover in them any other appearance of disease, than that their pupils, the right particularly, were much too large, and that their size was little affected by the quantity of light which passed through them. At first, I thought that their dilatation was occasioned by a defect of sensibility in the retinas; but I was quickly obliged to abandon this opinion, as the patient assured me, that his sensation of light was as strong as it had

ever been during any former period of his life. I next inquired, whether objects at different distances appeared to him equally distinct. He answered, that he saw distant objects accurately, and, in proof, told me what the hour was, by a remote public clock; but he added, that the letters of a book seemed to him so confused, that it was with difficulty he could make out the words which they composed. He was now desired to look at a page of a printed book through spectacles with convex glasses. He did so, and found that he could read it with ease. From these circumstances it was very plain, that this gentleman, at the same time that his pupils had become dilated, and his upper eye-lids paralytic, had acquired the sight of an old man, by losing suddenly the command of the muscles by which the eye is enabled to see near objects distinctly; it being known to those, who are conversant with the facts relating to human vision, that the eye in its relaxed state is fitted for distant objects, and that the seeing of near objects accurately is dependent upon muscular exertion.

The disease of which I have spoken is perhaps not extremely rare. For having related the preceding instance of it to Mr. Ware, a fellow of this society, he was kind enough shortly after to send to me a young woman, who appeared to be likewise affected with it. But as I saw her only once, and had not then sufficient time to examine her case minutely, I speak with diffidence concerning its nature.

II. After I had reflected frequently upon these cases, it occurred to me, that, as the juice of the herb belladonna, when applied to the eye, occasions the pupil to dilate considerably, and to become unalterable by light, an effect might at the same time be produced by it upon vision, similar to that which I have just described. I had, indeed, in the course of a few years immediately preceding, applied belladonna several times to my own eyes, without observing any change in my sight, beyond what I referred to the increased size of the pupils; but as I had not looked for any other, I thought it possible, that some additional one might have happened, without my having perceived it. I resolved therefore to make the experiment anew. But to conduct it with precision, it was previously necessary to know, to what extent I possessed the faculty of adapting my

eyes to different distances. On this subject I had made many experiments with great care, nearly twenty years before, and had ascertained,* that with my left eye, which was more perfect than the right, I could bring to single points on the retina, pencils of rays, which flowed from every distance, greater than that of seven inches from the cornea. In the mean time, however, my eyes had altered considerably, with respect to their seeing near objects distinctly, and I had, in consequence, been obliged, not only to use convex glasses, but to change them several times for others of higher power. No dependence therefore being now to be placed on my former experiments, in regard to the present state of my sight, I repeated them, and found, to my great surprise, that the power I once possessed of adapting my eyes to different distances was entirely gone; in other words, that I was now obliged to regard all objects, whether near or remote, in the same refractive state of those organs. I found also, that my eyes, considered as mere optical instruments, were nearly the same as they had been in my youth, and that the convex glasses which I used did very little more than supply, with respect to near objects, the place of a living power which I had lost, without compensating, except in a very small degree, for any alteration in the external shape of the eye, or any change in the configuration of its interior parts. I ascertained, for instance, that to give my left eye the refractive power which it formerly possessed while in its most relaxed state, that by which it was enabled to bring a pencil of parallel rays to a point on the retina, a glass of thirty-six inches focus was fully sufficient; whereas to produce an equal effect upon rays proceeding from a point at the distance of seven inches from my eye, the other extremity of my ancient range of perfect vision, I was now obliged to employ a glass having a focus of only six inches. I regret much, that I had not made such experiments frequently before, as I think it very probable, that I should have found a period in the progress of my vision to its present state, in which my capacity of seeing distant objects was the same as in my youth, and when there-

* Essay on Single Vision with two eyes, &c. p. 137.

fore the whole of my imperfect vision of near objects would have been owing to a loss of the muscular powers of my eye.

As there can be no good reason for supposing, that the changes which have occurred in my eyes are different from those, which the eyes of by far the greater number of persons, who are not short-sighted, undergo at the approach of old age, it is evident, that the experiments of Dr. Young* on the eye of Hanson, whom the learned author considered as a very fair subject for such trials, furnish no proof, that the want of the crystalline lens disables a person from having perfect vision at different distances; for as Hanson was sixty three years old, it is highly probable that the results of the experiments would have been exactly the same, if he had still possessed that part of his eye.

III. Having discovered, that my own eyes were unfit for the experiments, which I wished to be made with belladonna, I instructed an ingenious young physician, Dr. Cutting, from the island of Barbadoes, and now residing there, in the manner elsewhere described by me,† of ascertaining his range of perfect vision by means of luminous points. This he found, in consequence, to begin, with respect to his left eye, at the distance of six inches, and not to terminate at the distance of eight feet; beyond which he could not see clearly the object, with which he had hitherto made his experiments, the image of the flame of a candle in the bulb of a small thermometer. The flame of a lamp, distant about sixty yards, gave a faint indication of its rays meeting before they fell upon the retina; the rays from a star had very evidently their focus a little before that membrane. He now applied the juice of belladonna to his left eye. Half an hour after, when his pupil was but little dilated, perfect vision commenced at the distance of seven inches; in fifteen minutes more, it began at the distance of three feet and a half. When his pupil had acquired its greatest enlargement, the rays from the image of the flame of a candle, in the bulb of a small thermometer at the distance of eight feet, could not be prevented from converging to a point behind the retina. The rays from lamps still more distant, and from

* Phil. Trans. 1801, p. 66: see Journal 4to series, vol. v.

† Essay on Single Vision, &c. p. 116.

stars, had their focusses at the same time on the retina. This state of vision continued, in its greatest extent, to the following day; and it was not till the ninth day after the application of the belladonna, that he completely recovered the power of adapting his eye to near objects. While his left eye was thus affected, the vision of the right remained unaltered.

Dr. Cutting remarked, while his left eye was returning to its natural condition, that the diminution of the pupil, and the increase of the range of perfect vision, did not keep regular pace with each other; but that, after his pupil had nearly returned to its former size, his capacity of adapting the eye to different distances was still very limited. As these effects therefore are not inseparably connected, they may occur in others in a different manner from that which he observed. A great degree of dilatation, for example, may take place in the pupil, without a total want of the power to adapt the eye to different distances.

Though I could not doubt the accuracy of Dr. Cutting's observations, more especially as the altered state of his eye had lasted a considerable time, and as he had not been prevented by other occupations from attending minutely to the appearances, which were consequent upon it; yet, as he was the first person who had ever applied belladonna to his eye, for the purpose which has been mentioned, and as the results had been remarkable, I requested him to repeat the experiment with his other eye. He complied with my desire, and found, that the appearances which followed were similar to those, which had been produced by the application of belladonna to his left eye.

It will, perhaps, be thought extraordinary, that Dr. Cutting's eye in its relaxed state, before the application of the belladonna, brought parallel rays to a focus anterior to the retina; but that similar rays met in a point upon the retina, while the eye was under the full influence of that substance; as it may hence seem, that the belladonna had done more than merely suspend the exercise of the power, by which the eye is fitted to see near objects distinctly. An observation drawn from the former state of my own sight will, I expect, make this matter plain.

When I enjoyed the faculty of adapting my eyes to objects at different distances, the rays of a star, which was viewed at-

tentively by me, always met in a point a little before the retina;* whence I at first concluded, that my eye was unfit for accurate vision by parallel rays. But I afterward found, that if I looked at a star carelessly, its rays had then their concourse on the retina. In the former case, from long habit, originating in my having chiefly viewed near objects with attention, some small exertion was made for the accurate view of a distant object, though none was requisite; in the latter, all demand for exertion ceasing, my eye fell into the most relaxed condition, that by which it was fitted for parallel rays. Dr. Cutting's eye seems to have been similar to what my own once was, in regard to such rays; but as he had not acquired the faculty of viewing a distant object, without making some exertion, the rays from a star crossed one another in his eye before they came to the retina. The capacity, however, of making any exertion was taken away by the belladonna, and pencils of parallel rays were, in consequence, brought to points upon that membrane.

IV. Being now in possession of a new instrument, I next attempted to gain, by means of it, some illustration of the changes, which the vision of short-sighted persons undergoes from age.

It has been very generally, if not universally, asserted by systematic writers upon vision, that the short-sighted are rendered by age fitter for seeing distant objects than they were in their youth. But this opinion appears to me unfounded in fact, and to rest altogether upon a false analogy. If those who possess ordinary vision, when young, become, from the flatness of the cornea, or other changes in the mere structure of the eye, long-sighted as they approach to old age, it follows, that the short-sighted must, from similar changes, become better fitted to see distant objects. Such appears to have been their reasoning. But the course pursued by nature seems very different from that which they have assigned to her. For of four short-sighted persons of my acquaintance, the ages of whom are between fifty-four and sixty years, and into the state of whose vision I have inquired particularly, two have not observed that their vision has changed since they were young, and two have

* Essay on Single Vision, &c. p. 138.

lately become, in respect to distant objects, more short-sighted than they were formerly. As the manner, in which this change has occurred, is unnoticed, I believe, by any preceding author, I shall here relate the more remarkable of the two cases.

A gentleman, who is a fellow of this society, became short-sighted in early life; and as his profession obliged him to attend very much to minute visible objects, he for many years wore spectacles with concave glasses almost constantly, by the aid of which he saw as distinctly, and at as great a variety of distances, as those who enjoy the most perfect vision. At the age of fifty, however, he began to observe, that distant objects, though viewed through his glasses, appeared indistinct, and he was hence led to fear, that his eyes were affected with some disease. But happening one day to take up, in an optician's shop, a single concave glass, and to hold it before one of his eyes, while his spectacles were on, he found to his great joy, that he had regained distinct vision of distant objects. With regard to such objects, therefore, he had lately become shorter sighted than he had formerly been. But along with this change, another occurred of a directly opposite kind. For when he wished to examine a minute object attentively, such as he used to see accurately by means of his spectacles, he now found it necessary to lay them aside, and to employ his naked eye. He had become, therefore, in respect to near objects, longer-sighted. The power, consequently, in this gentleman, to adapt the eye to different distances, is either totally lost or much diminished; but the point, or small space to which his perfect vision is now confined, instead of being the most remote to which he could formerly accommodate his eyes, as is commonly the case with the ordinarily sighted when they are becoming old, is now placed *between* the two extremes of his former range of accurate vision. The eyes of the other short-sighted person, a physician of considerable learning, whose vision has been altered by age, have been affected in a similar manner, but not in so great a degree.

As the only change, which had occurred from age in the sight of such of my acquaintance as were considerably myopic, was a lessening, on both sides, of their range of perfect vision, I conceived, that this might be the ordinary procedure of nature in such cases, and that it might be imitated, in a young short-

sighted person, by the application of belladonna to his eyes. I have hitherto not been able to obtain permission to make the experiment on any young person, who is very short-sighted. Two gentlemen, however, who are somewhat short-sighted, have readily submitted to it; one of them, Mr. Blundell, a diligent and ingenious student of medicine; the other, Mr. Patrick, a well educated young surgeon in London. The first experiment was on Mr. Blundell, and the apparent result was, that the range of his accurate vision was considerably diminished at both ends, but not annihilated. Mr. Blundell, however, afterward informed me, that he repeated the experiment with more care in the country, and found, that in one eye, the nearest point of perfect vision was moved forward about two thirds of the whole range, and in the other about one third; but that, with respect to both eyes, the most remote points of the ranges were unchanged. He added, that while one eye was under the influence of the belladonna, the other became shorter-sighted than it had been before; but the difference was not so great, as to induce me to place entire confidence in the justness of his observation. I think it right to mention here, that, from mistake, I applied only two thirds of the ordinary quantity of belladonna to his eye, in the first experiment; and that he probably, in consequence of my example, applied no more when he made the second; as this might have been the reason, that during both experiments he retained, in part, the capacity of adapting his eyes to different distances.

The experiment on Mr. Patrick was conducted by myself, after he had been frequently exercised in observing the extent of his perfect vision. The results were similar to those which had been remarked by Dr. Cutting. The power of altering the adaptation of his eye, according to the distance of the objects viewed, was for some time entirely lost, and his sight became accurately fitted for such only, as were placed at the farther extremity of his former range of perfect vision. While one eye was under the influence of the belladonna, the vision of the other was unaffected.

From these experiments it seems probable, that belladonna will in no case produce the same effect upon a young short-sighted person, that age has produced in the two instances of

which I have spoken. I expect, however, to have an opportunity of repeating the experiment on two persons, who are very considerably short-sighted; and I shall take the liberty of communicating the result to the Royal Society, together with some observations I have already made, and others which I hope to make, respecting those persons, who seem to retain, to extreme old age, the power of seeing perfectly, as far as the accommodating power of the eye is concerned, both distant and near objects; and of others, who, after being without this power for many years, appear to regain it at a similar period of life. Probably the making known my intention may facilitate its accomplishment, by inducing other Fellows of the Society to furnish me with opportunities of increasing my knowledge of these subjects. In the mean time, I shall offer a few words upon two other topics in vision, which seem to derive illustration from my experiments with belladonna.

V. 1. Not only do the pupils move together, when both eyes are in a healthy state, but the pupils of one eye affected with gutta serena moves with the pupil of the other, as long as this remains sound. These facts are generally, but in my opinion erroneously, attributed to the immediate sympathy between the pupils. For when the pupil of one eye becomes dilated from the application of belladonna, the pupil of the other, so far from dilating, becomes smaller. It follows, therefore, that the size of the pupil is dependent, not only on the impression of light on the retina of its own eye, but on that also which is made on the retina of the other; and that the moving of the two together, which for the most part takes place, is only an accidental consequence of the fact which I have mentioned.

2. As the action of the external muscles of the eye has been frequently resorted to, for an explanation of its capacity to see objects perfectly at different distances, I requested Dr. Cutting to attend to this matter. He accordingly ascertained, while his eye was in its natural state, the distance from his face of the nearest point, at which he could make the two optic axes meet, this being the greatest trial of strength, to which those muscles can be exposed. Shortly after, he repeated the experiments, while, in consequence of the application of belladonna, he was without the power of adapting his eye

to different distances, and found, that the strength of those muscles was not diminished. It follows, therefore, not only that the external muscles have little or no concern in fitting the eye to see distinctly at different distances, but that the same is true with respect to the cornea; as we cannot suppose, that its mechanical properties were altered by the belladonna, or at least, that it became more inflexible from the application to it of the juice of that herb. I had before made a similar experiment on myself, by comparing what had been the strength of the external muscles of my eyes twenty years ago,* with what it was after I had lost the power of altering their refractive state; but though I found no difference, yet, as their coats might have in the mean time become more rigid, I thought it right to have the experiment repeated, in a manner to which no objection could be taken.

The only other part of the eye, or its appendages, which remains for enabling us to see equally well at very different distances, is the crystalline; and that it does produce this effect, either wholly, or very nearly so, is manifest, from the necessity even young persons are under, who have lost it, of using glasses of very different convexities for near and remote objects. But in what way this important office is performed by it seems still unknown. The learned Dr. Young, indeed, as well as others before him, has supposed, that the crystalline has the power of altering its figure; but the proofs hitherto given in favour of this opinion appear very defective. In 1794, I attempted to submit its justness to the test of direct experiments, by applying to the crystallines of oxen, which had been felled from thirty seconds to a minute before, chemical and mechanical stimuli, and those of galvanism and electricity; but in no instance was any alteration of figure, or other indication of muscular power, observed. All of these stimuli were applied to the crystalline while it was surrounded by air, and some of them while it was covered with warm water. Last summer, after I knew that men lose, from increase of years, the faculty of altering the refractive state of the eye, I thought it possible, that the oxen on which I had made the experiments were too

* Essay on Single Vision, &c. p. 138.

old for them. I therefore repeated most of them on the crystallines of a calf and a lamb; but still no motion was to be seen. Dr. Young has made similar experiments with a similar event; but he thinks, that no argument can hence be derived against his opinion, as neither can motion be excited in the uvea, by any artificial stimulus. In the first place, however, it is not agreeable to just reasoning, to regard an unknown thing as an exception to a general rule, rather than as an example of it; in the second, the motions of the uvea are involuntary, whereas the adaptation of the eye is, in part at least, under the command of the will; and in the third, the crystalline seems very unfit for performing the motions which he assigns to it; for if its figure be altered out of the body, by external force, it does not restore itself, but retains the shape which has been given to it, like a piece of dough, or soft clay. Possibly farther experiments with belladonna may contribute to remove the obscurity which at present surrounds this subject.

Transactions of the Physical Department of the Imperial Institute during the year 1811.

ANATOMY, PHYSIOLOGY, AND ZOOLOGY.

[From the London Medical and Physical Journal, for May, 1812.]

IN the account of the proceedings of the Institute last year, in noticing the researches upon the action of the nerves of the eighth pair in respiration, allusion was made to the important experiments by which M. Legallois, physician at Paris, has proved that very young animals may live without respiring for a certain time, the duration of which is proportionate to their nearness to the period of birth; in other words, that the younger the animal is, the longer it is capable of living without breathing.

M. Legallois, having subjected very young animals to other lesions, has obtained results yet more singular, and has been enabled to resolve a question disputed by anatomists nearly two centuries; viz. the influence which the nerves have in the motions of the heart.

Having decapitated some of these animals, he observed that their heads continued to give signs of life, precisely the same time for each age that the animals of that age could pass without respiring; from which he concluded, that the heads died only from want of respiration.

It is further determined by the experiments of Fontana, that it is possible to prolong life in the decollated trunk by inflating the lungs. The immediate principle of the life of the trunk is then in the trunk itself.

But, on the other hand, it is known that the life of each part requires its direct communication with the spinal marrow by means of the nerves, and a free circulation of blood in the portion of medulla oblongata which supplies nerves to that part.

This being admitted, we should suppose that the simple destruction of a portion of spinal marrow ought only to affect those parts to which it gives nerves; but it happened otherwise in the experiments of M. Legallois. The destruction of a portion of spinal marrow quickly killed the whole body, and consequently produced greater effect than decollation itself.

Upon attentively examining all the circumstances of this phenomenon, M. Legallois perceived that this lesion weakened and soon altogether stopped the circulation; the arteries emptied themselves. He therefore concluded, that in such cases death was produced by the motions of the heart being enfeebled.

This conjecture was verified by experiments. In diminishing, either by means of ligature on the arteries, or even by amputation, the number of parts to which the heart should supply blood, the power which remains in it is sufficient, because it has less efforts to make, and the lesion of the medulla is less quickly mortal. Thus an animal whose head is cut off, will die slower from a lesion of the spinal marrow, than if its head had remained on; and, as a partial lesion of the medulla, after some time, considerably diminishes the circulation in the parts to which the portion of marrow destroyed gives nerves, the destruction of a portion of medulla gives the means of destroying, after a little time, another portion without causing death so speedily. Thus, when we have decapitated an animal, it is more easy to destroy its cervical marrow without

killing the rest of its trunk; and, when we have destroyed its cervical marrow, it is easier to perform the same operation on the dorsal marrow; so that if we could supply them with the heart and lungs, we might make each of these amputated portions of the body live successively, without the others; and the chest which contains these organs can preserve its life a considerable time without the assistance of any of the other parts.

The general and direct result of these curious experiments is, that the motion of the heart depends entirely upon the spinal marrow which exercises its influence upon it, by means of the grand sympathetic. In this manner we can explain why the heart is affected by passions without immediately depending on the brain, and we are thus enabled to submit to the empire of the nerves the only muscular organ on which nervous influence was liable to some objections; in short, as the suppression of the brain does not immediately affect the motions of the heart, whilst that of the spinal marrow destroys them, the opinion advanced within some years by great physiologists, that the brain is not the only source of nervous action, but that each part of the nervous system also exercises a share in that action, is fully confirmed.

The count de Cessac, minister of war, and member of the class of the French language and literature, having consulted the class of sciences upon the means of preventing the ravages which certain worms make in the magazines of cloths and woollens, Messrs. de Lamarck, Vauquelin, Richard, and Bosc, have made a full report upon this important object.

These worms are the caterpillars of six or seven species of small night moths, which not only devour the hairs of animals, but also make of them small tubes, which serve them for clothing as well as a habitation. Many chemical agents will destroy these caterpillars, but most of them, if incautiously used, would do more mischief to the cloths than the insects themselves. However, heat may always be had recourse to, and in all cases it is well to prevent the multiplication of the caterpillars by destroying the moths, and using every means for preventing them getting into the magazines. The limits of this report

do not admit of our detailing the particulars recommended by the commissaries for accomplishing these different ends.

Natural philosophers have long sought for the causes of the phosphorescent appearance which the sea frequently exhibits. The late M. Peron published, some months before his death, a very complete work upon this curious phenomenon, in which he indicated a greater number of animals that contributed to it, and which often vary in themselves, according to the climate in which the phenomenon manifests itself.

M. Suroy, physician at Havre, excited by M. Peron, has examined the luminous animals of the port he inhabits, and has described one species globulous, about the size of a pin's head, and so numerous that it sometimes forms a thick crust on the surface of the water. Besides its spontaneous phosphorescence, it shines when it is irritated, and even when bruised.

M. Lamouroux, professor at Caen, has carefully examined certain small fish, known in Normandy by the name of *montée*, from their going in prodigious numbers up the rivers d'Orne, de Touque, and de Dive. They are commonly supposed to be the young of eels, but M. Lamouroux has found that they bear more resemblance to the conger, without, however, possessing all its characters; it is probable that they are the fry of a particular species, for it has been ascertained that several species of eels exist at the mouths of our rivers (in Normandy) not yet accurately described by naturalists.

Medicine and Surgery.

M. Chaussier, correspondent and professor in the faculty of medicine, has communicated a memoir upon that complaint so dangerous to lying-in women, known by the term *puerperal fever*, or *peritonitis*.

Physicians have long attributed it to a milky effusion, because they found, in the abdomen of persons who died of it, a serous fluid mixed with flakes resembling a caseous substance; but M. Chaussier has shown that these substances have nothing in common with milk, except a false resemblance. He quotes instances of a similar disease attacking men and young girls; proves that it is of a catarrhal nature; explains, from the changes of constitution during pregnancy and parturition,

why women in childbed are more exposed to it than other individuals; and, what is yet more important, declares, that in many cases he has obtained the most marked success in puerperal fever, by the employment of vapour baths, and friction of mercurial ointments on the abdomen.

M. Itard, physician to the school of the deaf and dumb, has succeeded in restoring a case by perforating the tympanum, as practised in this country, by Mr. A. P. Cooper.

Amongst the numerous operations to which the military surgeon is compelled by the casualties so frequent in battle, few are so hazardous, and so seldom attended with success, as amputation of the arm at the shoulder joint; and, of the many accidents that occur to interrupt the hope of the surgeon, none is more cruel than tetanus, or that convulsive rigidity which, in certain circumstances, seizes on the wounded, and hurries them to a death the more dreadful, because their intellectual faculties are not affected. M. le baron Larrey, whose experience in military surgery is proportioned to the murderous wars which have contributed to it, and to the various and remote theatres where he has been successively transported with the French armies, has presented to the class memoirs upon both these subjects. In the first he relates fourteen successful cases of amputation at the shoulder joint. In the second he states the almost miraculous effects which he has obtained from caustic (*du feu*) in tetanus, by applying it to those parts where he judged the centre of nervous irritation might be situated. Cold affusion, recommended by the English and German physicians, on the contrary, never afforded him any satisfactory results.

Another disease, which too frequently unites its ravages with those of war, is that kind of putrid fever which arises in places where men are crowded together in too great numbers, and which has been termed hospital, ship and jail fever. M. Masuyer, professor at Strasbourg, has addressed to the class a memoir, in which he affirms that acetite of ammonia, or *sp. mindererii*, given in large doses, has produced the most marked effects, and considerably diminished the mortality in those hospitals in which the fever prevailed. Those at Paris are now so well regulated, that happily no opportunity of verifying

the assertion of M. Masuyer has occurred; but the remedy has been tried in common putrid or adynamic fevers, and has been found to prevent the formation of the black crust or fur which covers the tongue and gums in such cases.

Among the medical works published this year by the class or its correspondents, we have chiefly to notice the treatise of M. Portal on the Nature and Treatment of Apoplexy; the second edition of the treatise on Organic Diseases of the Heart, by M. le baron Corvisart; the Medical Discourses, Memoirs, and Observations, of the late M. Desessarts; the great treatise on Hernia, by M. Scarpa, professor at Pavia; and the Manual of Practical Medicine, by M. Odier, professor at Geneva.

Veterinary Art and Agriculture.

It has long been known that the disease called *tourni* is caused by an animal in the class of intestinal worms, which exists in the brain of the sheep, and compresses or destroys that organ. Another disease in the same quadruped is occasioned by a worm called *douve*, which propagates in the biliary vessels of the liver; in short, some physicians suppose that the itch is owing to a small insect which is occasionally observed in the pustules produced in that complaint. M. Morel de Vindé, correspondent of the class, having remarked that a phthisis, which appeared on the suppression of an itch, had yielded to the internal use of sulphur, concluded that, being cured by the same means as the itch, it ought to depend on the same cause, that is, on the same parasitic animals which might have penetrated interiorly. He has extended this conjecture to several other diseases, and particularly to that named *pesoyne*, *pietain*, or *mal blanc*, which is an ulcer in the foot of the sheep. This malady, which, if neglected, quickly rots the foot and even the leg, and invariably destroys the animal, and for which no remedy has been found but the strongest caustics, has constantly been cured by a simple means devised by M. de Vindé, in consequence of the hypothesis which he had formed. His remedy consists in paring the horn of the foot till the white spot which the ulcer forms is seen, and slightly rubbing the horn

with a bunch of feathers dipped in aqua fortis. Some hours afterwards the sheep ceases to limp, and it is seldom necessary to repeat this simple operation. M. de Vindé has performed the experiment on more than fifty sheep without its ever failing, or making them feverish and lose their milk, as frequently happens when other means have been pursued.

M. d'Audebert is engaged in a great work upon the relations which the diseases of animals have to those of man. M. Noyez, veterinarian at Mirepoix, addressed a memoir to the class upon the good effects which result from the shearing of domestic animals, such as the ox and the horse, both in the cure and prevention of certain diseases.

SELECTED REVIEWS.

A Dissertation on the Bite of a Rabid Animal; being the Substance of an Essay which received a Prize from the Royal College of Surgeons in London, in the year 1811; by JAMES GILLMAN, F. L. S. Member of the Royal College of Surgeons in London, 8vo. pp. 181. Callow. London. 1812.

[From the London Medical and Physical Journal, for March, 1812.]

THE universal fatality, the obscurity, if not the uncertainty, of the pathognomonic signs, especially as they arise in the dog; the discrepancies of opinion respecting the *modus operandi* of the poisonous or infecting material; and the little light that examinations *post mortem* have afforded, combine to render *RABIES CANINA* a subject of great and important interest to the medical inquirer. As a question for philosophical discussion, as an illustration of the laws of life, and of the properties and principles of the mysterious power which impels and directs the movements and functions of organized beings, this disease also presents incitements of high consideration. Such inquiries have a legitimate claim, not only on philosophy and science, but on all branches and orders of society. Every disease over which medicine has failed to manifest a remedial power, has appropriate to it, the cunning assert, and the credulous believe, some never-failing nostrum: *Rabies Canina* has its thousand specifics. Memory sickens at the destruction which has followed the employment of these *specifics*. And it is on this point that we view Mr. Gillman's Dissertation as a public good. It establishes the fact, that no remedy has been yet discovered for the disease produced by the rabid poison acting on the system; and most forcibly shows, that the only means which can be employed, with any chance for success, are those which remove the poisonous fluid from the part to which it is applied.

In treating this important subject, the author of this Dissertation distributes his materials into three sections, in which he examines the "Characteristics of Rabies in a Dog;" the "Treatment of the Bite of a Rabid Animal;" and the "Consequences of that Bite."

In the first section we are presented with many curious and interesting details on the distinguishing marks constituting the character of rabies in the dog; a subject hitherto not sufficiently investigated, embarrassed with erroneous statements, false opinions, and hasty conclusions. That multitude of dogs have been denounced as laboring under this disease when it did not exist, and prematurely destroyed in consequence, no doubt can remain. That serious, though false, alarms have arisen from this mistake, is equally certain; and that persons bitten by dogs thus circumstanced, or having only had their saliva applied to the unabraded cuticle, have severely suffered from nervous affections induced by disturbed imagination, and imitating closely the specific disease, cannot, we think, be denied. A more important fact even than this, however, is connected with our ignorance of the pathognomonic signs of rabies as it appears in the dog. We shall find, as we follow Mr. Gillman in his inquiry, that one symptom which has generally and popularly been considered as marking this disease, does not invariably or commonly exist; and that a dog is actually suffering from rabies without being suspected, from the absence of a symptom which has given one synonym to the complaint.

To understand the history of this dreadful malady with a precision that may be particularly useful, it is essential to trace it from its source downward, and to begin the investigation with the genus of animals where it originates. Though rabies has appeared in one individual of another genus of the class *mammalia*, it seems consonant with propriety to confine the investigation to the genus *canis*; and to show distinctly the progress of symptoms in the dog. And, that we may not deviate from the graphic quality of a picture evidently drawn from the observation of nature, we shall give the detail in the words of the author, who, though he acknowledges the difficulty of giving a correct idea of the first symptoms that take place in this formidable malady, states the following phenomena, descriptive, as far as they go, of the progress of a case of rabies in the dog, to have fallen under his own notice.

“The animal always shows some marked deviation from his accustomed habits; a symptom which ought to be particularly regarded, and is most frequently not only a leading fea-

ture, but often an infallible proof, of approaching rabies. In the more domesticated animals, as lap-dogs, some strange peculiarities have been observed; as the picking up of different little objects, such as paper, thread, straw, &c. or any thing which may happen to be presented to their notice. They have sometimes been observed to eat their own excrements and lap their own urine: these last, perhaps, are the strongest proofs of rabies, and should place us very much upon our guard, as this depraved appetite seems peculiarly to mark this complaint. Still, however, in this stage of the disease, they seldom attack any one unless provoked to it.

“ It must be observed, that though a dog’s temper remains meek, and frequently continues so during the whole of the disease, yet he is easily alarmed. He often observes the same obedience to his master, and shows the same degree of attachment, but still he is extremely irritable, and always treacherous, suffering any one to fondle him, and then suddenly snaps or bites with almost the least apparent provocation. As the disease advances, his eyes sometimes become inflamed, and a purulent discharge issues from the lids. The *pharynx* in some cases has been known to become so much inflamed as to render him incapable of barking. This symptom, by sportsmen, has been particularly regarded, and by them termed dumb madness. When deprived of this power, he makes a dismal howl, which is so well known, that when once heard it cannot be mistaken; nevertheless this is not an universal symptom. The incipient stage of this disease has been marked by many writers with the loss of appetite, indifference, listlessness, and melancholy, which have been considered as strongly indicative of rabies; but they are symptoms that cannot be relied on, and attend many other diseases to which dogs are liable. Neither have they the least dread of fluids, and frequently eat with a voracious appetite.* I have had several patients under my care

* This is a fact of much importance, as it points out the dangerous policy of considering *hydrophobia* as a leading characteristic symptom of rabies. Mr. Gillman’s observation is corroborated by other practitioners. Dr. Clarke, of Nottingham, relates a case, which occurred in that neighbourhood, of a dog that was not suspected to labor under rabies until ten days after he had bitten an unfortunate person, who in six weeks after the bite died of *hydrophobia*. This

who were bitten by dogs decidedly rabid, and which both ate and drank a few minutes before and after they had committed the act;—consequently such statements should not be relied on.

“As the disease advances, the animal becomes extremely anxious and impatient, and has an inordinate desire to gnaw every thing around him. He is now seized with a more than usual antipathy to cats, which he bites, if within his reach. When chained or confined, he makes the greatest efforts to break loose; and, if he succeeds, he wanders about seeking other animals to bite, but more particularly some of his own species. From a bite in this particular stage of the disease, the consequences are most to be dreaded, and the greatest care should be taken to avoid him. It has been a generally received opinion, that he never moves out of his road to bite any one; but this apparent indifference never takes place till he is exhausted by the disease, or rather till he becomes incapable of the effort; for even now, while he is most active, he is seeking industriously different objects to bite, to which his attention appears solely directed. It has been before remarked that he does not avoid water, and frequently laps it greedily: still in this stage of the disease he is often without the power of swallowing it. Another and not an unfrequent attendant of rabies, is inflammation of the bowels, which may be considered as having taken place when the animal is observed sitting on his rump in apparently great pain: very often he has the appearance of being paralytic behind.

“In the last stage of this disease all the preceding symptoms are aggravated: he now becomes extremely feeble; his jaw drops as if paralyzed, and the saliva runs from his mouth; he wanders or rather staggers about with scarcely the power of biting; and, exhausted by the disease, dies generally on the fourth or fifth day from its commencement.”

We have here a relation of the progress of this malady,

dog ate and drank heartily, showed no signs of indisposition, hunted as usual, and occasionally went into a neighbour's house among children without injuring any of them; but on the morning of the tenth day (that is ten days after communicating the disease by the bite, and when he had no hydrophobia) he was observed snapping at every dog in the street, and was, in consequence, destroyed. Vide also Hunter's case of Master Rowley.

comprehending many striking circumstances, as they were presented to our author; but we doubt if observation of the symptoms as they arise, of their degree of intensity in the different stages of the complaint's progress, of their giving way to or becoming mixed with others as the disease advances, has been applied with sufficient correctness; or if experience has yet been enough extended and matured to furnish materials for a history of *Rabies*, discriminated and characteristic; distinguishing it from all other diseases, and especially some others of the class *Neuroses*, so delusively imitative, as frequently, we are persuaded, to have been mistaken for, and then furnishing cured cases of the (supposed) specific disease.* That this is yet the state of our knowledge, Mr. Gillman admits, when he remarks that the "symptoms which accompany this disorder have such variable aspects, and are so diversified, that he is afraid, upon attentive examination, there are few which can be considered essential, or which belong to it exclusively; and the greater part are, perhaps, secondary symptoms only, such as are common to other diseases, or casual and of uncertain occurrence; some arising out of previous symptoms, others the effect of adventitious circumstances."

Are we then to understand that Nature has neglected to place her essential stamp, her unobliterable hand-writing on this malady? Not so:—the physician is not yet enough learned in her phenomena, and covers his want of discernment with the opinion that she is here irregular, uncertain, adventitious, and indiscriminating. Let us pursue the path in which Mr. Gillman has ably started: apply our investigation to the original source—the *dog*, and, perhaps, the desired development is not far distant. That we may aid the *dénouement*, we shall present to our readers a specimen of the investigation we

* While hydrophobia shall be admitted as the pathognomonic mark of rabies, this mistake will happen. We could refer to numerous cases of spontaneous hydrophobia in confirmation of this, but we confine our reference, at present, to one printed in this Journal (vol. xxii. page 113), strongly marked, and terminating fatally on the third day. In this instance, all the symptoms had such a degree of intensity, the hydrophobia was so unequivocal, and the fatal termination so speedy, that without the most positive evidence to the contrary, it would become an established case of genuine rabies.

mean, as shown in the following clearly written case, containing the history and progress of rabies in a dog, verified by the effect of his bite upon other animals; and the dissection of the dog, with that of the creatures his bite had destroyed.

“ June 22d, 1811. A yard-dog belonging to a gentleman in Highgate killed yesterday one of his fowls, which he carried into his kennel. His master, when he saw it, put his hand into the kennel, took it out, and at the same time beat him: he made no attempt to bite him. The dog was not observed to be out of health, and, as was the usual practice at night, was unchained, and suffered to run about the stable yard, in which his kennel stood: on the following morning he was found in the pig-sty worrying an old sow and her two store pigs about ten weeks old, which he had bitten much, particularly about the ears. A suspicion now arose that the animal was rabid, and he was ordered by his master to be shot. Being informed of the circumstance by a friend, I immediately went to see him. I found the dog without the least inclination to be violent or to bite; on the contrary, he was shy, and appeared to be apprehensive of a second beating. This passiveness was observed, however, not to be his natural character; for when in health, if strangers entered the yard, he barked and was extremely violent: this variation from his usual habit placed me on my guard. There was, however, evidently much debility about him: he was thin, and had from one eye a slight purulent discharge; he lapped milk freely, and took animal food. I requested, however, to see the termination of the disease, which was granted; and therefore it was allowed to take its course. In the evening he took his food as usual; and it was remarked by the person who fed him that he had not differed since the morning, nor could we perceive that he was ill. The next morning he was more enfeebled, and began to refuse his food; in every other respect he appeared as yesterday: the third morning he was still more enfeebled, and paralytic in his hind legs; he also refused his food. He attempted once, during the day, to walk the length of his chain, which he could scarcely accomplish; and with the utmost difficulty he crawled back to his kennel. In this state of extreme debility and passiveness he laid the next day. On the fourth morning the gardener saw him so early as four in

the morning, at which time he could scarcely discern his breathing; at breakfast-time he found him dead.

“ The following were the appearances on dissection. The pia mater was slightly inflamed; the under surface of the epiglottis was also inflamed; the trachea and œsophagus exhibited no morbid appearances; the stomach contained a chocolate-colored gelatinous-like fluid; the villous coat was very generally inflamed, and several of the rugæ were lived, and of a chocolate colour; there were a great number of mortified spots, some having the appearance of flattened black currants; some more raised like pustules; and in some parts the villous coat was ulcerated and destroyed. No other parts exhibited any morbid appearance. The stomach of this animal presented such determined marks of this disease, that I have subjoined a plate to endeavour to illustrate these appearances. As I wished to prove, if possible, whether the fluid contained in these apparent pustules had the power of infecting other animals, I inoculated two rabbits with it in several places, but without producing the disease or affecting the health of the animal, apparently, in the slightest degree.

“ One of the young pigs, already referred to, which had been bitten least, and that only about the ears, on the morning of the tenth day after the bite, refused his food. When offered to him as usual, by placing it in his trough, after smelling at it, he ran back, pointed his nose in the air, and was much agitated: in the evening he had a convulsive motion, and twitching of his limbs. The eleventh day, (the second of the attack) he became extremely violent: when I saw him there was a considerable quantity of frothy saliva about his mouth: he started, and threw himself about in an extraordinary manner; sometimes he sprang at least three feet from the ground; then beat himself forcibly against the wall; and sometimes ran round on his hind legs, as dogs do when playing with their tails. This he continued till exhausted; he would fall down and pant; but soon again became convulsed, and leaped from the ground as before, falling with considerable violence on his back or sides. About noon, the person who fed him gave him a slight blow on the head, and killed him. On dissection the only parts inflamed were, the under surface of the epiglottis, and the villous coat

of the anterior surface of the stomach to the extent of the palm of the hand. The head had suffered such injury from the violence of the convulsions, that no dissection could be made: the skull and lower jaw were fractured: tongue in its natural state.

“ The other pig was seized on the noon of the fourteenth day after the bite. This animal was considerably torn by the teeth of the dog, and had a deep wound on the back between the shoulders. He was first seized with rigors, and stood shivering beside his trough, rubbing the bitten parts, which I had observed him to do also the day previous. He refused his food, and appeared debilitated, moving himself languidly and feebly. On the second day of his illness, he became paralysed in his hinder legs; and, after crawling, which he did in the morning, from his sty, in a few hours he was so much worse as to be unable to return. He lay on his side frothing at his mouth, rubbing his nose on the ground, and pulling the straw about and breaking it with his fore-feet and teeth the whole day; he made frequent attempts to swallow some of the bits of straw, in which he very seldom succeeded. The eye-lids were much separated, which gave a staring appearance; the conjunctive membrane was much inflamed. When the old sow went near, it made the same familiar noise or grunt; it did not appear to have the least inclination to bite any thing; I tried it repeatedly by putting a piece of stick into its mouth. The pupils of its eyes were, I thought, dilated, but it could see very well, and was alarmed at the motion of a stick when within two yards of it. On the third day, the seventeenth from the bite, it lay the whole time on its side; and, except occasionally slight twitchings in the legs, it remained perfectly still and unable to rise, having lost all power in its extremities; it squeaked when touched, as if the skin was more than usually sensible, and particularly when the mother went near it or touched it. Towards the evening the breathing became so feeble as scarcely to be discerned, and the conjunctive membrane so turgid as to protrude beyond the palpebræ. It died late at night, seventeen days from the bite.

“ *Appearances on dissection.*—On examining the brain there was considerable effusion of blood from the veins of the pia mater, contiguous to the superior longitudinal sinus; there was also much inflammation of the pia mater itself; no morbid ap-

pearances to be seen on the tongue; the under surface of the epiglottis was inflamed, as in the preceding case; in the œsophagus there was no disease; the inner membrane of the posterior surface of the trachea was very slightly inflamed; the villous coat of the anterior surface of the stomach towards the cardia was also very slightly inflamed; and the surfaces of two of the rugæ on the opposite side of the stomach presented a livid appearance, one more inclining to a chocolate color, approaching to mortification; the bladder was very much distended with urine, containing more than a pint. The tunica conjunctiva was turgid, and protruded beyond the palpebræ.

“ From this last pig two rabbits were inoculated with the saliva, but without producing any effect. Twenty-seven days after the bite I observed the old sow taking up in her mouth the dirty straw and filth that lay about the sty, which immediately gave rise to a suspicion that this peculiar disease was approaching. The following morning (twenty-eighth day) she refused her food, was perfectly quiet and harmless, came from her bed when called, and was seen to rub, very often in the day, the wounded parts upon her ears. In the evening having some ripe gooseberries in my hand, I went into the sty, (as I was willing to tempt her to eat, for since the morning she had not taken any food,) and offered her them: she ate a few, about half a dozen, and picked up by my feet several skins or husks which I had thrown down; she had, however, much difficulty in swallowing these small bodies.

“ The next morning (third day of the attack) she appeared nearly the same as the preceding evening; she was dull, but had no paralysis in her extremities, and came out of the sty when called. There was some inflammation about the parts which had been wounded by the dog’s teeth, and more so about those on the ears. I went again into the sty and offered her some milk; she made several attempts to drink, but could not; there was a peculiar convulsive motion of the head and twitching of the under jaw, but no dread of fluids, as she took up with her teeth, apparently observing much caution, some small pieces of cabbage-leaf which swam on the top of the wash; but after moving them two or three times between her teeth she suddenly dropped them, unable to chew or swallow them; she

walked steadily, but moved herself very slowly; the eyes had the natural appearance. By the evening this disorder had made much progress: the convulsive twitchings of the head were much increased, and she was extremely restless; for when this peculiar motion of the head from side to side had ceased, she was busily employed in grubbing up the earth with her nose, as if in search of food. When the spasmodic motion returned, (which it did once in a quarter of an hour or twenty minutes,) she squalled out and became alarmed when any one approached her. On the fourth morning all the preceding symptoms were increased, and every hour the paroxysms returned oftener and were more violent. She frequently jumped up suddenly on her hind legs, and threw herself upon her back with considerable violence: she was affected by the least noise; when I stamped with my foot firmly on the ground, she was thrown by the noise into the most violent convulsive state, and squalled horribly. To such a high degree, in short, did the morbid excitability of the nervous system arrive, that the poor animal was affected by the least touch, which seemed to be torture. In the evening the symptoms were still more aggravated: she beat herself against the walls, and sprang up against the roof of the sty. These attacks continued, and were repeated about once in every ten minutes, till about two o'clock in the morning, when I ceased to hear them, and when I arose I found her dead.

“*Appearances on dissection.*—Some slight marks of inflammation about the epiglottis: the villous coat of the stomach was inflamed towards the pylorus, and had several chocolate colored striated marks approaching to mortification.”

This account, drawn faithfully, as it appears, from nature, gives the history of rabies in some of its most interesting points. On the sometimes-controverted fact of rabies arising spontaneously, it seems decisive. A dog, chained in a yard, without intercourse with animals capable of inoculating upon him this disease, has it in its genuine form, verified by the effect produced by his saliva. This animal seems never to have been affected with the intense spasms and irritability commonly accompanying rabies; nor with a disposition to do mischief, except on the second night, when he worried the pigs: on the contrary, under the influence of the disease, he became more passive than was

natural to him. He was never hydrophobic, but died on the fourth morning from the attack; and on examination of the body, the stomach was found to exhibit morbid changes, greater than had before been seen to result from the action of this poison. The bitten pigs, although belonging to a genus in which rabies is not known spontaneously to arise, were much more violently affected, particularly the sow, with spasm and convulsions, but they had not hydrophobia. In them the disease rapidly reached its termination; but the marked character seen in the stomach of the dog was wanting. From these cases we should be led to the conclusion, that sometimes death is occasioned in rabies by visible mischief done to some vital organ; at other times by an affection of the brain and nerves, exhibiting on dissection no organic lesion or apparent morbid alteration. In one class the symptoms will be languor, debility, passiveness, paralysis, death; the dissection will show inflammation and sphacelus. In the other, languor, spasm, irritability, intense morbid sensibility, death: if the dissection shows appearance of disease, it is of a minor kind, and esteemed inadequate to the production of such symptoms, or of occasioning death. We are ready to allow that this generalization may be premature, and we venture it only as a hint. But we can understand that gangrene in the stomach may occasion death, and anticipate the frightful spasms we have seen occur in rabies; and we can without difficulty comprehend that when death results from convulsions, and has not the intervention of mortification, that every symptom will be more vehement. This, however, we must not consider as indicating any particular modification in the essence of the disease: it may depend on adventitious circumstances separate, or combined with idiosyncrasy. The great advantage of remarking these facts is, that they prove rabies to exist independent of hydrophobia and convulsion. We have before shown, by a case cited from our *Journal*,* that hydrophobia, in its most violent form, does also arise independent of the rabid poison. To correct the false idea of hydrophobia being an essential or pathognomonic symptom of rabies, we have dwelled with some solicitude on this part of

* Vide Note, page 185.

Mr. Gillman's Dissertation, and would impress our readers with the propriety of rejecting an opinion founded on loose and popular tradition rather than on an observance of nature. Without the verification of the disease being propagated by the *saliva* of the dog, in the case related by Mr. Gillman, it would, perhaps, be denied that he was destroyed by *rabies*. It is plain, therefore, that we have yet to learn the generic marks of this disease.

There are other facts connected with this detail, of no small importance, and which would have been lost to science but for the vigilance of our author. The varying periods at which the disease appears after the inoculation, is distinctly marked in these instances. In one pig the disease appeared on the 10th day after the bite; in the other on the 14th; and the sow was attacked on the 27th day. In two of these cases there was evident increasing irritation in the bitten part: it was seen in the pig to precede the symptoms twenty-four hours, and also in the sow, probably, though unobserved until the general affection had appeared.*

It is known with great certainty, that the specific poison of *rabies* exists in the *saliva*; but it has been a question how far the solids and fluids have been generally contaminated. This history furnishes some facts which go far to prove that the infecting material of *rabies* is hardly to be found but in the

* The time at which the disease appears in various individuals after the infliction of the bite, is known to be indeterminate. It is desirable to ascertain the shortest and the longest period at which *rabies* has occurred after the insertion of the poison. We insert the following history to assist in determining this question. On the 8th of June, 1791, the man who slept in the kennel, and had the care, of Earl Fitzwilliam's hounds, was in the night unusually disturbed by the hounds fighting. He got up several times to quiet them, but always found the same hound quarrelling. He was induced in consequence to notice him; and, finding him stupid and quarrelsome, he confined him by himself: the hounds were quiet for the remainder of the night. At the end of the third day he became rabid, and on the fifth died. Preparations were made for confining the forty-two couple of hounds separately. The symptoms and progress of the disease were exactly minuted by a medical gentleman. Six of the hounds became rabid in the following order:—the first on July the 1st; the second on August the 3d; the third on September the 3d; the fourth on September the 4th; the fifth on November the 10th, the sixth on December the 8th.—*Daniel's Rural Sports*.

saliva; and certainly a morbid fluid is no more to be detected in the other fluids of the body, than is the natural venom of the viper or *crotalus horridus*.

“As I wished (says Mr. Gillman) to prove, if possible, whether the fluid contained in these apparent pustules (on the villous coat of the stomach of the dog whose case has just been related) had the power of infecting other animals, I inoculated two rabbits with it in several places, but without producing the disease or affecting the health of the animal apparently in the slightest degree.”

The sow and two pigs which were bitten by this dog, and died rabid, were dissected by Mr. Brooks the anatomist; and we observed, that, when employed in this process, his fingers had several slight wounds upon them: but no inconvenience occurred. The flesh of these rabid animals was also perfectly harmless: it was eaten by dogs, foxes, eagles, and hawks, with impunity. A rabid dog was examined after death by Mr. Bayford, of Parson's Green. While inspecting the fauces of this dog, Mr. Bayford cut his finger, but without subsequent disease. The apprehension, therefore, that considerable danger is incurred by anatomists in the dissection of rabid animals, seems unfounded.

The remaining part of this section treats of the remote or primary cause of rabies, and of its spontaneous origin: but, as the author's reasoning turns upon facts selected from printed documents, already in the hands of medical readers, we shall pass it over with observing that the occasional causes from which this disease is said to arise are climate—putrid aliment—deficiency of water—want of perspiration—and worms under the tongue; and shall conclude, thus far, with citing the subsequent corollaries.

“1st. That wildness, fury, madness, &c. which the term *rabid* implies, does not form an essential character of the disease.

“2d. That the dread of fluids, in consequence of which, by some writers, this disease has been termed *hydrophobia*, is not an essential symptom, nor is the loss of appetite; but, on the contrary, dogs eagerly lap fluids, although in some period of

the disease they are deprived of the power of swallowing them; and they will frequently as freely eat.

"3d. That appearances of inflammation, particularly of the stomach, are not always found after death; and that the bodies of these animals occasionally exhibit no mark of disease whatever.

"4th. That, although the preceding symptoms may be absent, as fierceness, loss of appetite, and dread of water, and though there should be no mark of disease after death, &c. the dog is capable of communicating this disease to various animals, particularly to the human species.

"5th. That climate, putrid aliment, want of water, deficiency of perspiration, &c. are, from the best authorities, not the cause of rabies.

"6th. That there is not evidence sufficient to disprove that this disease arises spontaneously in dogs, but that neglect of cleanliness and confinement may be considered as highly contributing to the production of this dreadful malady.

"7th. That the proposals for quarantine, but for a much longer period, are deserving of consideration, and may tend at least to develope some important points.

"8th. That all persons should avoid familiarity with strange dogs, and never trust or fondle any dog when he has deviated from his general appearances or habits, or is out of health.

"9th. When a person is bitten, the dog should be confined for ten days, and not killed immediately, as is too often practised, in order that a correct opinion may be formed of the case."

In the second section, "*On the Treatment of the Bite of a Rabid Animal*," the author goes into a question of the deepest importance. In rabies, when once manifested in the system, all human skill, all power of medicine, has failed: to prevent the accession of, rather than study for a remedy for, the disease now actually existing, should then be the point to which all our views ought to be directed. It is matter of curious speculation, rather than of practical utility; proper to agitate the reasoning pathologist, more than to influence the plain therapist, whether the rabid "virus is mixed with the blood through the medium of the lymphatics, which absorb the poi-

sonous saliva, and thus in a secondary manner, acting on the nerves, producing this fatal disorder: or that the infection acts locally, and by irritation, not only on the nerves, but tendons also, sympathetically affects the whole nervous system, without the introduction of the poison into the circulation." Whichever of these be the fact, the effect is the same, always resisting medicine, always terminating in death. To prevent this absorption, or this irritation without absorption, by removing the deleterious body, is, therefore, the great and only object.

To effect this, various means have been suggested. Scarification, suction, caustic, ablution, and excision, are those which most deserve attention; and of these our author inquires into the *modus operandi* and comparative efficacy of three—caustic, ablution, and excision.

To the employment of caustic he objects, both theoretically and practically. The frequent accession of rabies after the application of these substances to the wound, is doubtless a forcible argument against trusting to them; and many cases are cited to establish this fact. But whether the reasoning intended to explain this result be satisfactory, we shall submit to our readers; doing the author, however, the justice of allowing him to state his own conclusions. After a short inquiry into the chemical composition of the saliva, and the structure of the muscular fibre, the affinities to which they are liable, and the decomposition they are subjected to, he observes,

"Whenever alkalies, as pure potash, or pure potash and lime, are inserted into a wound containing the poisonous saliva, and there, as is generally practised, rubbed about for some little time, the alkali first unites with the morbid saliva, next with the more muscular or solid parts, &c. of the wound, till the whole of the surrounding parts, as far as its action extends, are intimately blended. A new compound is in consequence formed, a saponaceous mass, or eschar, which is generally supposed to remain until it sloughs away. Of what then is this new compound formed, but of dead animal matter, a caustic, and the peculiar poison which we believe to be the cause of hydrophobia (*rabies*,) and which it ought to be our immediate care to remove? It is true the neighbouring absorbents are destroyed as far as the action of the caustic extends; but the canine virus is as likely to extend with it, being only in a state of union from the commencement of this operation, which, if

continued, the poison is uniformly dispersed through the whole of the adjacent parts, forming an animal soap by their commixture. Hence, by such means, a more extended surface is exposed to the action of the absorbents, which are rendered highly irritable, and more active, and in consequence, perhaps, the case becomes more desperate."

"The same argument will equally hold good with regard to the other powerful solvents, as the acids, and the acid preparations, if the poison be not decomposed or removed. If they should destroy the absorbents about the wound, they, previously to this, dissolve the morbid saliva; therefore, the sound parts are likely to become contaminated by them the moment they enter the wound, and hold the virus in solution; for by corroding the muscular parts the poison is diffused. If perchance this poison should happily be discovered to be some peculiar saline compound, or if the poison should be rendered inert, when mixed with the agents already referred to, we might then hope every thing from the application of either acid or alkaline preparations, as we certainly know they possess the power of destroying most organic compounds: but, as we are still utterly ignorant of the chemical nature of this poison, let us prefer imitating and following those methods which appear to present the more wished-for and desired success."

We come now to notice "those methods which appear to *present* the desired success." These are EXTIRPATION and ABLUTION.* It is self-evident that the entire removal of the contagious material will afford the most perfect security, and this is effected with greater certainty by excision of the bitten part, than by any other process. But excision is an operation, when it can be employed, of great nicety and care; not the mere cutting away the part with clumsy haste.

"Much caution and judgment is requisite in excising the bitten part. I have known of failures (and there are some recorded by Dr. Hamilton) where the parts were excised, and

* To which may be added powerful blistering; a remedy which has frequently been used as a prophylactic, by one of the Editors of the Eclectic Repertory, and apparently, with complete success. The decoction of cantharides in spirits of turpentine, See No. 1. of Eclectic Repertory, will probably prove more effectual than the common mode of blistering.

afterwards cauterized; but I am fully persuaded that this arises from want of sufficient attention to some of the minuter circumstances of the operation.

“The first thing requisite, before the excision of the bitten part, is to wash not only the inside of the wound, but also the surrounding parts, with great care; for, if this be neglected, and the poisonous saliva be not removed, in making incisions on each side of the wound, the sound parts through which they are made will be inoculated with virus. Two incisions should then be made, one on each side of the wound, forming an ellipsis in such as will admit of it, which should be carried to such a depth as completely to remove the part. It should then be carefully examined if there is any part in the piece excised through which the dog’s tooth appears to have passed; and in case there is, the excision should be carried deeper. In making the incisions, great attention should be paid to the direction of the tooth; and, if the knife should enter the wound made by the dog’s tooth, I should consider it always necessary to recommence the operation with a clean knife, and this as often as the occurrence should take place: for, if we continue to use the same knife, which is likely to be contaminated in consequence of its entering the wounded parts, the operation may be rendered useless by the sound parts becoming inoculated with the canine virus.”

These ample directions for the excision of the bitten part, are sufficiently impressive and judicious, we trust, to be indelibly fixed on the operator’s mind. To little purpose, indeed, will the surgeon expose his patient to fear and pain, if with his knife he transfers the poison to the parts through which his incision passes. We are so fully convinced of the possibility, and even the probability, of this, that we feel indebted to our author for putting the case with such precision and force. We shall make no apology for pursuing this important part of the prophylactic treatment a little further. Mr. Gillman has given very proper directions for the operation of excision, and has increased the value of these directions by cautions which have left his statement scarcely susceptible of improvement. But there is still a serious question connected with this process: At what period after the infliction of the wound should excision be employed? *Immediately.* Various impediments,

however, arise to prevent this. At what period then after the bite can it be used with a prospect of success? there is great reason to believe at any time after, even when symptoms of rabies have arisen.

“In the determination of the question (says Mr. Gillman) as to the time when extirpation of the parts infected by the bite may be performed, it is of great importance to consider whether the poison does always remain in the substance where it was first infused, until by inflammation, or by some other cause, a sufficient dose is generated to infect the whole system. Indeed, the notorious connection between a painful or inflamed state of the original wound immediately preceding the constitutional symptoms, warrants the supposition, and points out the expediency of removing or destroying the parts to the last.”

So far as our own observation and experience have gone, they have met this conclusion. Not more than two years since a man came under our care, who was bitten by a dog believed to be rabid. A few hours after he received a wound on his hand, the bite was cut out, and certainly without precautions suggested by our author. The wound soon healed. In six weeks from the bite he again applied to us. The cicatrix was now elevated, had changed to a livid hue, and he felt a tingling sensation in the part, where the wound had been. Ample extirpation of the part, with an inch and a half of the surrounding sound substance, was had recourse to. He has since felt no inconvenience; neither has the second cicatrix ever assumed the livid hue of the first. It cannot be said, positively, that this person would have fallen into rabies; the symptoms were too threatening to trust to the chance; and the fair conclusion is, that he was saved by the second excision.

It sometimes happens that the bite is so placed as not to admit of excision. In this dilemma the resource is, if we reject caustic, a careful and persevering ABLUTION. The rationale of this is obvious; but there may be some question as to the fluid to be employed. When the choice is not influenced by circumstances, our author uses a weak solution of volatile alkali, in the proportion of one part of the alkali to four of water. With this solution,* (fully capable of dissolving the

* Mr. Gillman ascertained this proportion to be fittest for the purposes of ablation; when stronger it is observed to corrode the solid parts, and pro-

saliva,) the wounded parts should be freely washed, and injections, with a syringe, forcibly made into the wound. After this has been persevered in for a considerable time, it is proposed to use warm water to promote a flow of blood, which may assist in washing away any remaining particle of the poison.

The method here laid down cannot be objected to, but it seems to admit of being extended upon the same principle, both by a combination and arrangement of the several means proposed, and by the introduction of an auxiliary of which Mr. Gillman has noticed the name only; we mean the exhausted receiver, or *suction*. On this last we have one remark to make. If the hazard, incurred by an application of the lips to the wound, be a valid objection, and perhaps it is, it does not extend to the use of cupping-glasses. If after excision, or before, or at any period, it be an object to promote a full flow of blood from the wound, how can this be effected more certainly than by suction? We have therefore no hesitation in recommending cupping, as one, and possibly not the least, effectual part of the prophylactic process.

From a view of the subject then, as stated by our author, and from our own reflections and observations upon it, we shall venture to suggest the following routine, as affording a fair prospect of security from the dreadful effects of this poison. Immediately on the infliction of the bite, assiduous ablution with the first water that can be found, either with or without soap, and this to be continued unceasingly until professional aid is procured. On the arrival of the surgeon, full excision of the bitten part, according to the directions before stated, if the circumstance of situation, or other objections, do not forbid. After excision, ablution again with solution of volatile alkali in water; and, when the flow of blood begins to cease, suction with the cupping-glass. The alternate employment of ablution and the exhausted receiver to be continued many hours. We forbear to fix on a definite time; that must be left to the discretion of the surgeon employed; but we do not know

ably to hold the virus in solution. It is therefore rejected on the principle that induced him to reject caustic, as previously stated. While employing ablution he suggests the propriety of using clean sponges.

why it should not be extended to twenty-four hours. The object is of the last importance; time and trouble are minor considerations. After proceeding thus far, why should not caustic, or some irritating material, be applied to the wound, so as to produce a slough, in the first instance, and afterwards a purulent discharge, for some weeks? Both analogy and very fairly-stated facts countenance this part of the process. It is well known that inoculation for the small-pox succeeds with most certainty when the puncture is slight, and when no inflammation or morbid action ensues until excited by the virus. On the contrary, when much disease takes place in the part where the variolous fluid is inserted, from any other cause than the stimulus of that fluid itself, it is also well known, that the chance for infecting the system, suffers a reduction agreeing with the degree of adventitious inflammation. In the case of Bellamy (*Med. Observ. and Inquiries*,) the wound was small, and soon healed,—he died rabid. In the case of his servant, bitten by the same animal and nearly at the same time, the wound ulcerated and could not be healed for many weeks,—she recovered without any symptoms of rabies. We do not state this as a conclusive fact; but it is strong presumptive evidence, supported by close analogies.

The objections to the use of caustics, drawn from or supported by the chemistry of the day, though ingeniously put, carry with them no conviction. The chemistry of life, if the expression may be permitted, differs so much from that of the crucible and the furnace, that facts drawn from the latter, with a view to explain the principles and actions of the former, lead into endless labyrinths of fallacy and error. We agree thus far with our author, however, on the subject of caustic: it should never be a primary application, but, for reasons previously stated, should close the prophylactic process.

Upon the preventive remedies, supposed to act on the system, we must not waste time. From the *Pulvis Antilyssus* of Dr. Mead, to the clumsiest *Mad-dog drink* that cunning ever imposed upon credulity, all is mistake or deception. They have always been worse than useless—they have sunk the patient into idiotic security—and the dreadful symptoms of rabies have awakened him, too late, to a sense of his condition.

The third and last section treats of the "*Consequences of the Bite of a Rabid Animal.*" Over this we shall rapidly pass. It is painful to record events unsustained by a single instance of success. Every remedy employed against the disease, excited by the rabid virus, has hitherto proved inert, even to moderate the symptoms. To recount their names, doses, and effects, is but giving a muster-roll of deaths. In consonance, however, to the principle which has influenced us throughout our observations on this Dissertation—that of presenting to our readers those facts which the author has taken from nature, we shall cite a case of rabies which fell partly under his own observation, and is partly copied from the notes of Mr. Scudamore.

"December 13th, 1807. James Anderson, aged 14, of slight unhealthy aspect, subject to frequent headaches, was yesterday at noon attacked with rigors, succeeded by hot fits, and this morning (Sunday) had all the symptoms of hydrophobia, of which he died the night following. About an hour before his death, he had an interval of reason, and gave a full account of the accident. From him and from his mother were learnt the following particulars of the case preceding the attack:—A dog ran into the stable which he was cleaning, and bit him in the under lip. A few days after he complained to his mother that it pained him. She examined it. Being ignorant of the cause, and considering it only a chop, she applied tallow to it, and no further notice was taken of the wound. In about a week or ten days he complained of giddiness and pain in his head, which, as he was subject to, gave no alarm. About this period also he began to spit unusually: this continued for a fortnight, so as to excite his mother's fears lest he should be consumptive. He passed his nights indifferently, and in uneasy sleep. On Wednesday, three weeks subsequent to the bite, he made serious complaint of his head and the wounded part, which was on the left side: it throbbed with violence, the pain extending to the ear. The mother, considering these symptoms as only a cold, applied camomile fomentations to the side of the face, and gave him some warm gin and water, which appeared to relieve him. He then went to bed, but slept little, and continued occasionally to complain of his head. At this

time, however, and during Thursday and Friday, he ate and drank without any inconvenience. On Saturday he lost his appetite; and, while employed in cleaning his horse, which it was his occupation to drive about in a water cart, he felt alternately cold and hot, and was obliged to discontinue his employment. He complained of thirst; the phlegm was viscid, which he spat vehemently, desiring those around him to remove, as he feared they would suffocate him. During the night he made a violent attempt to get out of bed, which those around him resisted. He very angrily remonstrated with them, but soon became calm. This morning (Sunday) his mother, being alarmed, sent to Mr. Scudamore, who found that he had passed a restless night, was extremely agitated, had great anxiety of breathing, and complained of a slight sense of constriction across the upper part of his chest. His eyes were suffused, and the pupils dilated; tongue dry, and furred in the middle, but moist at the edges; pulse from 80 to 100, quickly varying; countenance melancholy, and expressive of great distress: had much of the characteristic spasm in attempting to swallow. Calomel and opium were administered. Three P.M. Mr. Scudamore saw him again; pulse 90; he had taken eight grains of calomel and six of opium, and had swallowed also about half a pint of toast and water, but with great difficulty and distress, requiring his head to be held. Six P.M. I first saw him. He was dosing; but, on my entering the room, he was instantly seized with a convulsive sigh, and sprang up in the bed suddenly. He was perfectly rational, but spoke in a melancholy tone, and complained much of sickness, which he said prevented his drinking. He had a slight pain about the scrobiculus cordis, but no pain whatever about the throat. When requested to drink, he was again seized with a convulsive inspiration, and answered quickly, he would do it if he could. He then called to his mother to hold his head, seized a cup which was offered to him filled with toast and water, and with many convulsive sighs, and with much difficulty, swallowed the greatest part of the fluid contained in it. He complained soon again of thirst, but said sickness at his stomach prevented him from drinking any more. Half a lemon lying on the table in the room, I requested him to squeeze a little of the juice into

his mouth; but he complained again of much sickness, and would not attempt it, though his thirst was great. However, as I wished him to rub his tongue only with the lemon, he at length consented; but he had as much difficulty in carrying it to his mouth, and placing it on his tongue, and was nearly as much agitated, as in swallowing the toast and water. He appeared drowsy from the opium, and was disposed to sleep; but, when he lay down for a few minutes and attempted to doze, he was suddenly seized with a convulsive inspiration, and as suddenly jumped up in the bed, called for his mother, and was much agitated and distressed. At eight o'clock I saw him again. He said his head was much relieved since the morning; suffered no one to touch him but his mother. Pulse 80, extremely tremulous. Eleven at night, I repeated the visit. He had passed a pint of urine, was still sensible, but much agitated, and sighed more frequently. Pulse 90, hard and tremulous. Any new question that was now put to him, the least motion in the room, the drawing the bed curtains, stirring the fire, or any little noise whatever, was immediately succeeded by a convulsive sigh, and increased his anxiety and distress. The proposition of placing him in the warm bath so alarmed him, that it was not put into execution. The nausea still continued; he could not be prevailed upon to drink, and was much distressed with flatulence. Twelve at night, all the symptoms the same, and he knew those around him. Mr. Scudamore again proposed to place him in the bath. He assented to the proposition; heard, as he observed, the reasoning upon it mildly, but requested him in the most anxious manner to wait. When he offered him drink, he refused it quickly and emphatically, but in terms of great civility. He passed his urine a little at a time. After a considerable persuasion, he got from the bed, but would not go into the bath: had no intestinal evacuation. Took his powders nearly every hour, which consisted of three grains of calomel and three of opium. Mr. Scudamore's assistant remained with him during the night, who reported, that he was more tranquil till half past two, when six grains of calomel and opium were given him in jelly, which he had great difficulty in swallowing. Dozed, but was disturbed with frequent spasms, till near four. He then became extremely rest-

less. Pulse 120. When toast and water was offered him, it increased his agitation, and his pulse to 132. Asked at five o'clock for toast and water, which increased his spasms violently. Pulse 100.

"Monday, December 16th. All symptoms the same as yesterday; spasms as frequent, but more feeble; continued the opium and calomel as often as he could be made to swallow. Musk and camphor were now administered by the advice of Drs. Marcet and Yelloly, who visited him, but he could not be made to swallow more than one dose. In the evening he was much exhausted by the disease: he called frequently for tea, which he drank eagerly, but with much agitation. He succeeded in swallowing several small teacups full, and ate a small quantity of cake. He seemed pleased at the efforts he had made in swallowing, exclaiming "well done! at it again;" but vomited all he took soon after. He now became so extremely irritable that he would not allow his mother, nor in short any thing, to touch him. These symptoms increased till within two hours of his death, when he had a calm interval, and requested to see his companion who was bitten at the same time with himself. He then related the circumstance of his 'having been bitten by a large dog, as big as the coachman's, with long ears that reached to his nose.' At length he gradually sunk; his hands and feet became cold; he rose up in his bed, fell back, muttered, and expired."

We could add to the value of this article by inserting, from the appendix, a well written case of *Rabies*, by Mr. Carlisle; but we have already, perhaps, notwithstanding the interesting nature of the subject, trespassed too much on the time of our readers, and must hasten to a conclusion.

The impression made on our minds, upon reading this Dissertation, was, that of its being the production of a man of strong intellect, and a close observer of nature. The facts he relates from his own knowledge are interesting, generally, and sometimes have an air of novelty. The history of the appearances in the stomach of the rabid dog, accompanied with a plate, we believe to be new, so far as regards any printed account illustrated by an engraving. His cases are detailed with minute precision, and he has added to the prophylactic pro-

cess important precautionary directions. His selections from other writers, made to fill up the picture, will be useful to the tyro; but those who have left the schools will only be impressed with the result of his own individual knowledge, as having the chance of communicating new facts, and presenting novel illustration. With his style we are not quite satisfied, and we could object to some of his conclusions. The cure of rabies he has left as he found it—hopeless; but he has enforced, most judiciously, the prophylaxis. We must consider this Dissertation to be a valuable addition to the stock of medical knowledge on Rabies Canina.

An Inquiry into the Process of Nature in Repairing Injuries of the Intestines: illustrating the Treatment of Penetrating Wounds, and Strangulated Hernia. By BENJAMIN TRAVERS, Demonstrator of Anatomy at Guy's Hospital, Surgeon to the Hon. East India Company, and to the London Infirmary for Diseases of the Eye. 8vo. London. 1812. Pages 384. Longman, &c.

[From the London Medical Review, for April 1812.]

A BETTER exposition of the general plan of this instructive and interesting inquiry we cannot offer to our readers, than will be found in the following extract from the preface to the very valuable performance now before us. “Minute attention to the operations of the restorative principle will afford a clue to the rational treatment of those injuries in which it is displayed. Thus we have learned to unite wounds by adhesion, instead of leaving them to be filled slowly up with new matter—to rupture the capsule of the opake crystalline, in order to bring about its solution in the aqueous humor—to tie the diseased artery, more effectually to cut off the supply, and force the collateral circulation; and in the work which I now lay before the profession, my object has been in like manner to take a lesson from nature. I have endeavoured to ascertain the plan and limit of her operations in an important class of injuries, to compare the facts of history with the results of ex-

periment, and from these sources to derive a rational and consistent theory of treatment."

The particular circumstances which induced Mr. Travers to institute this inquiry, he has likewise very distinctly stated in the introduction; and they are at once so curious and so important, that they will, we have no doubt, appear to all as they have done to us, loudly to demand and abundantly to justify the undertaking.

"The numerous examples of spontaneous recovery from wounds of the intestinal canal, and our imperfect acquaintance with the method of cure which nature adopts in these cases, were the circumstances which led me to the present inquiry. I was additionally urged to prosecute it, by observing the varieties of opinion which embarrass the practice of surgeons, and the questionable tendency of their proceedings in cases of mortified hernia. The frequent success of the operation of nature in such cases, and the frequent failure of the contrivances of art, are demonstrated by a reference to the sources of professional information; and I trust it is unnecessary to argue the importance of an inquiry into the cause of this humiliating distinction."*

The ancient opinion was that wounds of the intestines, by permitting the efflux of their contents and causing inflammation, were certainly mortal. It was found however, that, in fact, men frequently recovered, though weapons had passed through their bodies, and hence it was conjectured that these had absolutely transfixed the abdomen without injuring any of the important viscera. The supposition therefore, was, that such an injury was little more than a wound of cellular membrane, and scarcely of more importance than one of similar extent under the skin. Though it was difficult to conceive how a weapon could pass in this manner, yet the idea prevailed, till several instances occurred of wounds attended with discharge of blood, or of the missiles by which they were inflicted, by the natural passages, or sometimes with perceptible efflux of the contents of the viscera, and which wounds, nevertheless, were followed by recovery. Many such cases are recorded by authors, and of

* Introduction.

these that so often quoted from Mons. Littre is among the most remarkable.

“A man, æt. 34, of a robust constitution, who was occasionally the subject of mental derangement, inflicted eighteen wounds upon his body with a knife, the blade of which was five inches long and seven lines broad at the handle. Of these wounds eight had penetrated the abdomen. Tension of the belly, difficult and painful respiration, nausea, and vomiting ensued. Blood was passed by the mouth and by stool. By means of copious bleeding and a strict regimen, the patient recovered in the course of two months. During the cure the body was preserved in the supine posture, that, if possible, the effusion which was expected might be restrained; for, from the direction and depth of the wounds, and the passage of blood by the bowels, no doubt was entertained that these parts were penetrated. In a returning paroxysm, eighteen months subsequent to the former violence, the unfortunate man destroyed himself by leaping from a window three stories high. This event afforded M. Littre a highly interesting opportunity of ascertaining the existence and mode of reparation of the intestinal wounds. It is sufficient for my present purpose to say, that the jejunum and colon presented extensive cicatrices.”*

John Hunter during his service in the army, as well as in his general practice, met with cases of this kind, and traced the mode of reparation to that general law of adhesive inflammation, the phenomena of which he had more especially set forth. He did not so much discover any new fact, as constitute a class of facts already known into a general law. He showed, that certain parts of the body when divided, had a constant tendency to adhere, and with regard to the particular instance of wounded intestine, he gave proof that this tendency was brought into action in twenty-four hours. He therefore justly attributed the occasional freedom from important injury to this rapid adhesion of the edges of the wound to that peritoneal surface to which they were contiguous. He adds a conjecture, that effusion of the contents of the intestines into the cavity of the abdomen, takes place chiefly or solely when the bowel is full, or

* Inquiry, page 21.

the wound large, and asserts that where a bullet in its rapid passage has injured, but not broken the gut, and when in consequence the gut after some time yields, and pours out its contents externally, there is never any danger of internal effusion, the parts round the slough being closed by the same process of adhesion. Mr. John Bell has also insisted on this process of quick union; and has further opposed those who argue from the mischievous effects of air on shut cavities, by showing that, from the perfect fulness of these sacs, air cannot enter them without considerable force. He adds, that this fulness preserves the intestines in the same relative position, and in mutual contact.

Such seems to have been the state of known facts, and of common opinions, in respect to wounds penetrating the abdomen, when Mr. Travers entered on his inquiry. By numerous experiments he has ascertained, that the general opinion of the frequent occurrence of effusion from wounded intestines is erroneous; that in fact it does not take place in a great majority of instances: and that it occurs only from a large wound in a distended bowel; or where, as he has proved by various cases, air is extravasated or blood poured out into the belly; for by these fluids less resistance is made to the escape of fæculent matters.

As it has been known since the dissection by Littre, confirmed by several subsequent cases, that the intestines may be extensively penetrated, and afterwards closed by cicatrization or adhesion with little inconvenience, it may be asked of what use it is to multiply experiments, to thrust swords into the flanks of horses, and impale dogs upon catlins in proof of the fact. This may possibly have been done with too free a hand; but the use of it we conceive to be this: it proves that what have been regarded merely as exceptions, in truth constitute the general rule; that the ready tendency of the peritoneum to adhesive inflammation, which had been witnessed in some instances, and justly expected in many, does invariably occur with a most saving celerity, for our author has afforded demonstration of its existence in seven hours; and it tends therefore not only to increase our hopes of a happy event in such perilous cases, but it proves to us the means by which it is to

be promoted. By diminishing our despondency, it adds to our watchfulness and perseverance in enjoining quietness and abstinence, leads us to watch with anxiety for the approach of general inflammation, and, on its appearance, to use the only means in our power, bleeding, with a freedom which can only proceed from a well grounded prospect of success.

Mr. Bell lays it down in the beginning of his valuable chapter on this subject, that "a wound of the belly is a mortal wound,"* that it is so by inflammation, and that a common cause of such inflammation is shown in the fact that "if an intestine be wounded it pours out its fæces into the abdomen." In this same chapter Mr. Bell has certainly cited numerous cases in which these wounds were not mortal, in which no effusion or inflammation had occurred, and he has ably and forcibly shown the modes by which the mortality has been obviated by nature. Still he regards such examples as exceptions to the general law.

"In one short sentence we announce the general principles of such wounds,—in one short and general prognostic we declare them to be fatal; we thus bestow but a few moments on their general character, while we spend hours in marking their lesser varieties, and in recording all the accidents and chance causes, collecting evidence about hair-breadth escapes, till we almost lose sight of the general principle which proves such wounds to be mortal. This confusion must be peculiarly felt by a diligent student, who, the more he reads, the more he wanders, finds anuses at the groin, and miraculous recoveries in every book, and reads of cures till he forgets that there are dangers."†

Now Mr. Travers has proved recovery from a punctured wound in the intestine not to be a miracle. He has proved what Mr. Bell supposed to be a frequent process, to be a constant one, and in so doing we are confident that he has added much to the just and persevering treatment of such cases. His details are too minute to be extracted, but we think the dissections, after several of his experiments, highly important as well as

* Discourses on Wounds, part 2, page 56.

† *Ib.* 59.

curious, and we consider his practice to be rational as well as bold.*

A curious fact is shown in regard to one species of a ruptured intestine, namely, that in which no wound occurs in the parietes. Such injuries generally admit of effusion into the abdomen, and are consequently fatal. Of this fact the following simple solution is given by our author.

“I should explain it by the difference in the nature of the injury which the bowel sustains when perforated by a sword or bullet, as in the one case, or burst or ulcerated as in the other. A rupture by concussion could only take place under a distended state of the bowel, a condition most favourable to effusion, and from the texture of the part, a rupture so produced would seldom be of limited extent. The process of ulceration by which an aperture is formed commences in the *internal* coat of the bowel, which has always incurred a more extensive læsion than the peritoneal covering. The puncture or cut is merely a solution of continuity in a point or line, the ulcerated wound is an actual loss of substance. The consequence of this difference is, that while the former is small, is glued up by effusion from the cut vessels, or, if large, is nearly obliterated by the full eversion of villous coat, the latter is a permanent orifice.†

Recent writers have strangely overlooked an effect of wounded intestine noticed by Haller, and fully confirmed by the experiments of our author; the above named eversion of the mucous coat.

“If a gut be punctured, the elasticity of the peritoneum, and the contraction of the muscular fibres open the wound, and the villous or mucous coat forms a sort of hernial protrusion, and obliterates the aperture. If an incised wound be made, the edges are drawn asunder and reverted, so that the mucous coat is elevated in the form of a fleshy lip. If the section be transverse, the lip is broad and bulbous, and acquires tumefaction and redness from the contraction of the circular fibres behind it, which produces, relatively to the everted portion, the appearance of a cervix. If the incision is according to the length

* Inquiry, page 75.

† Ib. 46.

of the cylinder, the lip is narrow, and the contraction of the adjacent longitudinal, resisting that of the circular fibres, gives the orifice an oval form. This eversion and contraction is produced by that series of motions which constitutes the peristaltic motion of the intestines.”*

This effect it is of importance to bear in mind.

In order to ascertain how great a degree of injury nature might be able to repair, Mr. Travers divided the small intestine of several dogs to the mesentery. The result was death in all, from effusion of aliment if the animal had been recently fed, and if it had fasted for some time, from inflammation, attended by separation of the ends of the divided gut, eversion of the mucous coat, and obliteration of the cavity, partly by this eversion and partly by a plug of coagulated chyle. The same effects followed a division of three quarters of the cylinder. When half the canal was divided, a curious pouch was in one instance formed round the injured bowel.

“A pouch resembling somewhat the diverticulum in these animals, was formed opposite to the external wound, on the side of the parietes, by the living peritoneum, on the other side by the mesentery of the injured intestine, that intestine itself, and an adjacent fold which had contracted with it a close adhesion. The pouch, thus formed and insulated, included the opposed sections of the gut, and had received its contents. The tube at the orifices was narrowed by the half eversion, but offered no impediment to the passage of fluids.”†

Though our author did not succeed in producing this pouch in more than one instance, he yet conceives it probable, that in accidental wounds, when the bowels remain *in situ*, and are uninjured by being drawn out and handled, this effect may more frequently occur. Whether this kind of sac would have allowed the intestinal action to have continued, our author professes himself unable to decide. He regards retraction and eversion as the evils which prevent the healing process: these occur to a great degree, the injured parts cannot unite from distance, and the mucous membrane is indisposed to adhesive inflammation. In consequence he conceived, that if the canal

* Inquiry, page 85.

† Ib. 96.

could be perfectly divided by means which yet prevented retraction, the same consequences would not ensue. To put this opinion to the proof, a ligature was drawn tight round the duodenum of a dog, which at first was indisposed, but afterwards perfectly recovered, and was killed. The canal was indented but continuous, though the mucous coat was deficient at the point of division. A longitudinal incision, one inch and a half in length, was spontaneously repaired by adhesion.

The foregoing observations chiefly relate to wounds beyond the hand of the surgeon. Another class of injuries consists of those in which the wounded bowel protrudes, or effuses its contents immediately underneath the external wound, through which they pass. Numerous instances of this kind are on record, and great doubts have been entertained as to the proper mode of treating such complicated cases.

It has been taught upon high authority, that where an intestine is lying at the bottom of an external wound, pouring out fæces, it ought to be laid bare, and the wound stitched. By an abundant record of cases and experiments, it is here shown that this process can never be required, for the same quick union which closes a wound inflicted deep in the belly, will, in the above noticed instances, consolidate the edges of the wound with the adjacent parietes. Effusion into the abdomen is thus effectually precluded, and in process of time the external wound will generally close over the intestine, and the fæces pass by the natural outlet.

Those who have witnessed this rapid adhesion, have applied its principle to slight wounds which are absolutely within our power, and have directed that such should either be returned simply, or reduced with a ligature on the mesentery to retain them in contact with the external opening. Cases have occurred in which each of these practices has been followed, and in which the injury has been repaired by cicatrix, or by the more tedious process of granulation. In other instances even slight punctures and cuts have been surrounded by a ligature, or stitched, and have done equally well. As, therefore, there is a possibility, in simply returning the injured gut, that effusion may occur, and as in keeping the external orifice open by the use of a ligature on the mesentery, a more tedious process is established, there

seems to be no adequate reason why this chance, or this delay should be encountered, as it does not appear that the ligature on a simply wounded and uninflamed gut, produces any additional irritation though it adds to the security.

“The grand objections to the practice of returning a wounded intestine without a suture are—the heavy drain upon the system, if, as is probable, the drain be alimentary;” in cases where the wound is large and effusion has actually occurred, “the irritation occasioned by the continual discharge, and the tardiness of the healing process—the danger of future impediment to the free course of these matters, from a permanent angularity of the adhering fold, or the encroachment of the parietes upon the tube in healing; and lastly, of future prolapse, and even of artificial anus, from the actual deficiency of the paries intestinalis, corresponding to the extent of the cicatrix.”*

When therefore we have the bowel absolutely in our hands, we can readily close it. When the orifice is very small, it may be surrounded by a ligature, but where it is large, considerable doubts have arisen as to the proper mode of effecting the closure. Various experiments have been made to ascertain the point, and much contrariety of opinion has existed. We have been advised, where the whole cylinder has been severed, to introduce the upper within the lower portion of intestine, and to sew them in that situation. This is not, as Mr. John Bell asserts, “an untried experiment.” It was tried long ago with success by Ramdohr, and has been often imitated in experiments since, though not with equally fortunate events; the chief difficulty being to introduce one portion of gut within the other, on account of the contraction and eversion with which each end is affected. In cuts of greater or less extent some have recommended the use of a single stitch, others two or three interrupted stitches, and others again have preferred the uninterrupted suture. A large proportion of writers direct, that in each of these methods, but more especially in the two former, a ligature on the mesentery should confine the returned bowel to the external wound.

* Inquiry, page 185.

Mr. John Bell, who is at all times so ready to reprehend his immediate competitor for writing fearlessly on what he had never seen, says,

“ If it should happen that a gut is cut fairly across in all its circle, the mesentery still has its hold upon each end of the divided intestine; and the two ends of the intestine can never be far separated from each other; nor can the one end be introduced so far within the other as to make the double row of stitches round and round, the one row distant from the other an inch. It is not by this thorough stitching that such a gut is to become sound; it is only by adhesions, and by two adhesions taking place at the same time. The two ends of the gut may be made to adhere to each other; and the prudent way of favouring these adhesions, is to introduce the one piece of intestine a little way within the other, and make one single stitch in that part of the circle which is farthest from the mesentery, and then draw the gut, by means of that thread, close up to the wound, and thus it will probably happen that the mesentery will keep its side of the circle firm, that the stitch will keep the opposite side firm, that the gut being drawn by the thread and pushed from behind, and flattened by the universal pressure within the abdomen, the double adhesion may take place, viz. of the surfaces of the intestines to each other, and of the wound of the intestine to that part of the inner surface of the belly where it is open and inflamed by the outward wound.”*

Mr. Bell has cited no authorities for the above assertion, and he probably never knew an instance at all resembling that which he has supposed. Those who have made the trial have found, that it is nearly impossible in all cases, and quite so in by far the greater number, to introduce one end of the divided gut within the other even a little, by reason of that eversion of the mucous coat, and contraction of the gut of which Mr. Bell does not seem to have been aware, since he no where speaks of it: it has been also found that the single stitch affords no effectual security for the adhesion. It did not require the accuracy and minute research of Mr. Travers to oppose the futility of these declarations. Dr. Smith of the Philadelphia Medical

* Discourses on Wounds, Part 2. page 119.

Society sewed wounded intestines in dogs, as nearly as possible according to this plan, and invariably found it to fail, though he has unaccountably omitted to mention the minute particulars which occasioned the failure. Mr. Travers has proceeded much further, and with more scientific research, and has found union prevented by the eversion of the mucous coat, which neither assumes the adhesive inflammation, nor seems disposed to granulate. When an intestine then is extensively wounded, and a single stitch only employed, it does not prevent retraction and eversion, and consequently does not prevent a fatal efflux of its fecal contents. We cannot refrain from quoting those decisive facts which place this question finally at rest.

“I divided the small intestine of a dog which had been for some hours fasting, and carried a fine stitch through the everted edges, at the point opposite to their connection with the mesentery. The gut was then allowed to slip back, and the wound closed. The animal survived only a few hours.

“*Examination.* The peritoneum appeared highly inflamed. Adhesions were formed among the neighbouring folds, and lymph was deposited in masses upon the sides of the wounded gut. These presented two large circular orifices. Among the viscera were found a quantity of bilious fluid, and some extraneous substances, and a worm was depending from one of the apertures. By the artificial connection of the edges in a single point of their circumference, and their natural connection at the mesentery, they could recede only in the intervals, and here they had receded to the utmost. The suture prevented the contraction of the circular fibres, from the obliquity produced by the more powerful action of the longitudinal between the two fixed points. All circumstances therefore combined to facilitate effusion, the obvious cause of the quickly destructive inflammation.

“I increased the number of points of contact by placing three single stitches upon a divided intestine, cutting away the threads and returning the gut. The animal refused food, and died on the afternoon of the second day.

“*Examination.* Similar marks of inflammation presented themselves. The omentum was partially wrapped about the

wound, but one of the spaces between the suture was uncovered, and from this the intestinal fluids had escaped. On cautiously raising the adhering omentum, the remaining stitches came in view. Here again the retraction was considerable, and the intervening elliptical aperture proportionally large. On the side next to the peritoneum, however, the edges were in contact and adhered so as to unite the sections at an angle.

“From these experiments it appears, that opposition at a point or points, is as respects effusion, more disadvantageous than no opposition at all; for it admits of retraction and prevents contraction, so that each stitch becomes the extremity of an aperture, the area of which is determined by the distance of the stitches.”*

As such methods do not succeed then, what are more effectual? Mr. Astley Cooper and Dr. Thomson have instituted experiments, the apparent object of many of which was to estimate the comparative efficacy of the interrupted and continued suture: and the result has been that each has been successful. Such an issue is perfectly explicable by the experiments of our author, who shows, that a cut intestine, deep in the belly, sometimes heals by the adhesion of its edges to each other, like other divided parts, though it is more frequently closed by the union of its edges, when remote from each other, to the neighbouring parts. When the ligature is used, the former of these processes, as he further proves, is alone to be depended on, and that to secure its success accurate contact is required. Whatever ensures this contact will be efficient, and provided this object be attained, it is indifferent what form of ligature is employed for the purpose. So decidedly do our author's conclusions differ from those of Mr. John Bell, that we think it may not only be amusing but instructive to place them in contrast before our readers.

“I have endeavoured to represent the real condition of a wounded bowel and the easy cure of it, in that simple form in which I have conceived it. I have advised that one single stitch only should be struck through the wounded bowel, and then drawn also through the wound. And I have ventured

* Inquiry, p. 116.

moreover to say that if there is in all surgery a work of supererogation, it is this of sewing up a wounded gut. The mechanical and vulgar conceptions of those who believed that a wounded intestine is closed not by inflammation, and the adhesions of contiguous parts, appears to me offensive to a degree which I shall hardly venture to express to you. But it strikes deeper and wider than this; it is not offensive only; it is dangerous; for while I take an interest and find only a pleasant labour in teaching the young surgeon what is right to do, and what is consistent with the simple ways of nature and the economy of the living body, he is seduced by a formal account of most curious and ingenious methods of sewing a gut, and is drawn aside to follow after such puerile conceits, thinking to do more than even nature can do in such a case.”*

Another subject of difference has arisen in regard to the mode of disposing of the ends of the ligature after the suture has been made. Mr. Benjamin Bell first pointed out the propriety of cutting the ligature close to the gut, and returning it into the abdomen unconnected with its external wound.

“It is probable, whatever suture may be employed, if more than one or two stitches have been passed, that it will be very difficult and even uncertain our getting the ligature away, without hurting the intestines more than we ought to do. I would never advise therefore, with any view of this kind, that the ligature should be left out at the wound; less danger will arise from cutting it entirely away and allowing the stitches to remain. A considerable part of it will fall into the cavity of the gut.”†

Mr. Bell does not adduce any facts in support of this assertion, but Dr. Thomson, in order to decide the point, made several experiments, the results of which were that the ligatures tied on the outside of the intestine were found within its canal. This fact has been confirmed by the observations of our author, who gives the following solution of the appearances.

“The fact of reparation by artificial connexion of the divided parts being established, it remains only that I should point out the several stages of a process, which has not, to my know-

* Discourses on Wounds, Part 2, page 108.

† System of Surgery. Vol. 2, page 128, 7th Edit.

ledge, been described. It commences with the agglutination of the contiguous mucous surfaces, probably by the exudation of a fluid similar to that which glues together the sides of a recent flesh wound, when supported in contact. The adhesive inflammation supervenes and binds down the reverted edges of the peritoneal coat, from the whole circumference of which a layer of coagulable lymph is effused, so as to envelope the wounded bowel. The action of the longitudinal fibres being opposed to the artificial connexion, the sections mutually recede as the sutures loosen by the process of ulcerative absorption. During this time the lymph deposited becomes organized, by which further retraction is prevented, and the original cylinder, with the threads attached to it, are encompassed by the new tunic.

“The gut ulcerates at the points of the ligatures and these fall into its canal. The fissures left by the ligatures are gradually healed up; but the opposed villous surfaces, so far as my observation goes, neither adhere nor become consolidated by granulation, so that the interstice marking the division internally is probably never obliterated.”*

In conformity with these facts, Mr. T. decidedly recommends the use of a ligature so as to secure accurate contact, the removal of the ends of the ligature close to the knot on the gut, and the careful reduction of the injured part. In all instances indeed of protruded bowel, he strenuously insists on the necessity of its cautious and orderly return in the inverse order of its protrusion, being satisfied that mere displacement acts as a frequent cause of active inflammation in the peritoneum.

The most interesting part of this investigation relates to mortified hernia. It must be sufficiently known to our readers, that an infinite variety of opinions has existed, and does still exist, in respect to the proper mode of treating this shocking malady. Of this variety a most interesting account is given in the last three chapters of the present work, which concludes with a detailed statement of that which the author has been led to prefer.

Littre recommended that the lower portion of the canal

* Inquiry, &c. page 123.

should be tied, after excision of the mortified cylinder, and that the upper should be retained at the wound, to form there a permanent artificial anus. La Peyronie, unable to distinguish the upper from the lower orifice in one instance, retained them both at the wound which closed over them, and the continuity of the canal was maintained. In other instances, therefore, he followed the same method, endeavouring as much as possible to approximate the ends of the severed intestine, but in these attempts he met with little success. Ramdohr, after similar excision, thrust the upper within the lower part of the bowel, and sewed them together. He succeeded in one case; as did also Duverger, who introduced a piece of calf's trachea within the canal. Petit simply dilated the stricture and opened the mortified coats of intestine. In several instances which occurred to him, free incisions into the sphacelated parts were the only operation, and this was successful. Similar events occurred to Gooch, who perfectly accords with Petit, in thinking that the cure of these cases is due more to nature than to art; and that the province of the surgeon should be restricted to the removal of whatever might obstruct her proceedings. Louis objects to cutting the stricture where the gut is adherent; he merely removes the mortified parts, leaving the sound untouched. Where the gut does not adhere, he cuts out a portion of cylinder including the spoiled part, and follows the operation of Ramdohr or of Peyronie. Sharp recommends excision of the sphacelus, the enlargement of the stricture, and the closure of the gut by the interrupted suture. If the latter cannot be effected he unites the divided intestine to the wound.

“ Richter, whose treatise on hernia discovers a profundity of research, and an extent of personal observation in his time unparalleled, is elaborate in his discrimination of the several stages of gangrene and of the treatment which they respectively demand. If a suspicious spot appears upon the surface of a strangulated gut, he reduces it with a ligature of the mesentery. If it penetrates the coats of the bowel, and the intestine adheres, he dilates the ring; but instead of reducing the gut, leaves it in the sac. If the gut so affected is loose and unadherent, he fixes it by a ligature on the outside of the ring, and cuts away the dead part, leaving only a sphacelated margin to

be separated by nature. On the second day he reduces it, taking care to place the opening exactly behind the ring. If only a part of the circumference of a gut is strangulated and in a state of gangrene, he leaves it wholly to nature, refraining from the incision of the stricture. If many small spots and small openings appear in the strangulated intestine, he adopts the same practice; but if they are extensive as well as numerous, he excises the whole piece, and treats it as if totally gangrened. When this is the case, he excises the dead part; and if unadhering, confines the sound extremities by a ligature to the mouth of the wound. He then clears the canal by means of a purgative and a clyster, and leaves the ultimate disposal of the parts to nature.”*

Pott confines a partially mortified intestine by a ligature on the mesentery to the wound; but excises a completely gangrenous cylinder, and unites the ends by suture, confining the returned gut to the parietes. If the ends cannot be brought together, he confines both to the wounds. Chopart, Desault, and Sabatier return small spots as just mentioned, but open the larger spots. After describing the symptoms of mortification in a strangulated hernia, Mr. Cooper says,

“The hernia now sometimes returns into the cavity of the abdomen without assistance, and the patient survives but a few hours, but sometimes the skin over the tumour sloughs, the intestine gives way, and the fæces being discharged at the opening, the symptoms of strangulation soon after cease. When this happens, the intestine contracts adhesions to the hernial sac. The portion which has been mortified sloughs away, and an artificial anus becomes established, through which, generally during the remaining part of the patient’s miserable existence, the fæces are constantly discharged. However it sometimes happens that when the intestine has sloughed, that a reunion takes place of its extremities, the extreme wound gradually heals, the artificial anus is closed, and the fæces resume their natural course.”†

“In performing the operation for strangulated hernia, where the intestine is mortified, the appearance which it assumes, is

* Inquiry, Page 290.

† Cooper on Hernia, Part I. Page 33.

that of a dark purple, or leaden colored spot, or spots, which readily break down under the impression of the fingers. The other part of the intestine is of a chocolate brown color, which has been often mistaken for mortification, but its color and its firmness prove that it has not advanced to that state. Every part of the surface of the intestine is covered by coagulable lymph of a brown color."

"If a small hole only has been produced, the intestine should be returned into the abdomen, excepting that portion of the cylinder in which the hole exists. A needle and ligature should be passed through the mesentery at right angles with the intestine, to prevent its including the branches of the mesenteric artery, which supply that part of the intestine, and then through the mouth of the hernial sac; and, tying the threads, the intestine becomes confined to the mouth of the sac, and the fæces pass readily from the opening by the wound, but will in part take their course by the rectum. As granulations arise and the wound becomes closed, the opening in the intestine is gradually shut, and an artificial anus is effectually prevented."*

"When the whole cylinder of the intestine is mortified, it is necessary to proceed very differently. Then the mortified part of the intestine should be cut away, and the ends are to be brought in contact, and confined by means of four ligatures."†

"If the intestine has a large opening in its side occupying one half of its cylinder, it is, if left to nature, sure to produce an artificial anus. Sufficient of the intestine is not then remaining to conduct the fæces in their proper channel. The wound heals so as to form an orifice sufficiently large to prevent the escape of that portion of the fæces which the intestine cannot convey, and if it heals further than to that point, abscesses frequently form, which, when they burst, discharge, with the matter, a considerable quantity of fæces."‡

"As it appears, therefore, that there is little probability of relief to the patient, when this state is once established, the surgeon should attempt, by all the means in his power, to prevent its occurrence.

"The means which will occur to the mind as being most

* Cooper on Hernia, Part I. Page 34.

† Id. 35.

‡ Id. 38.

likely to effect the object, will probably be to make an uninterrupted suture upon the opening in the intestine, but this treatment would leave the intestine with only half its cylinder, the *feces* will not pass, they will either soon burst the stitches from the wound, or it will become necessary for the surgeon to cut them to unload the intestine, and prevent the death of his patient.”*

“ Instead of endeavouring to maintain a diminished canal by sewing the intestine longitudinally, the surgeon should not only cut out the mortified part, but all the remaining part of the cylinder of the intestine, and then, approximating the extremities of the intestine, he should endeavour to unite it in the manner in which a transverse division of the intestine is treated, by making four sutures upon it, and confining it by means of the mesentery to the mouth of the hernial sac.”†

The treatment recommended by Lawrence is “ to dilate the stricture, and to leave the subsequent progress of the cure entirely to nature. The sloughs,” he adds, “ will be cast off; the ends of the gut are retained by the adhesive process in a state of apposition to each other, the most favourable to their union, the wound contracts and often completely closes, so that the continuity of the alimentary canal is perfectly reestablished. The interference of art can only be prejudicial in this process. When we consider the loose state of the intestinal canal, in its natural condition, we find a difficulty in conceiving how its continuity can be restored, after considerable portions have perished: yet indubitable proofs of this fact exist, and induce us to place confidence in the resources of nature.”‡

To this statement he afterwards adds, “ perhaps the only step, which would be justifiable, is that of making an incision in the sphacelated part; this will promote the evacuation of the alimentary canal, and afford considerable relief.”§

When reviewing Mr. Lawrence’s first edition, we remarked on the passages above cited, “ it remains for the candid observation of those who have the opportunity to determine, whether

* Cooper on Hernia, Part I. Page 39.

† Id. 40.

‡ Lawrence on Hernia, 1st Edit. Page 201, 2d Edit. Page 283.

§ Id. 1st Edit. Page 203, 2d Edit. Page 285.

in cases where patients survive the operation, the removal of the gangrenous intestine by the scissars is, or is not, an objectionable practice; and whether it is giving a fairer chance of recovery to second the efforts of the constitution during the process of separation, while we facilitate, by a free opening, the evacuation of the alimentary matters." Mr. Astley Cooper, in the month following that of our publication, operated according to this simple method, and in the appendix to Hey's last edition of his *Surgery*, he published the case, which was completely successful, and then subjoins the following directions, "as an answer to a query in the *London Medical Review*."

"From the foregoing history it appears that the proper treatment of a mortified intestine in strangulated hernia, consists in the two following circumstances.

"1st. In dividing the stricture, so as entirely to remove the cause of strangulation; and

"2dly. In making an opening into the intestine so as to give a free outlet for the discharge of the accumulated feces in the intestine within the abdomen. If the stricture only is divided, the constipation, hiccough, and vomiting continue, but if the intestine is opened, the patient in a few hours becomes relieved of those symptoms."*

We have thus laid before our readers what we believe to be a pretty fair, though a hurried sketch of the most prominent oppositions in opinion, which have existed in respect to this very critical point. With such a puzzle of discordant facts and authorities before him, our author has proceeded to investigate the subject minutely, and to adopt, if possible, a rational system of practice.

He states in the first place that strangulation is twofold, viz. that which checks circulation, as well as the transmission of aliment, through the strictured gut; and that which simply impedes the intestinal function. He affirms that where the perfect strangulation occurs, it is rapid in its progress to gangrene, the unstrictured part of the canal within the abdomen remaining

* Hey's *Surgery*, Appendix to the last edition.

uninflamed; and that the less firm constriction gives rise to a more protracted state of suffering, with a tendency to general peritoneal inflammation, before the strangulated gut mortifies. This he advances as a general though not an universal truth; and he therefore maintains that abdominal inflammation proceeds not from the local injury of the strictured part, but from obstruction to the action of the bowels. This obstruction, he argues, continued long from any cause, is equal to produce the effect; but the tighter the stricture on a ruptured gut, the sooner nature is likely to relieve herself, by effusing the contents externally, or into the hernial sac.

He next observes, that it is not an object to ascertain, as several have asserted, whether the intestine do or do not adhere to the parietes, for that in every case of strangulation, and consequent gangrene, such a degree of inflammation must have preceded as to have insured a perfect adhesion of the gut at the stricture.

Almost all writers on this subject have expressed surprise at such an union of the ends of a mortified intestine as to maintain the continuity of the canal, after a foot or more has been cast off. Mr. Travers therefore points out, that whatever length of intestine may be lost, still the two extremities are tied down close to each other at the mouth of the sac, adhering all round to the stricture, and by one part of their surface to each other.

“ In the ordinary situation of hernia, the portions of intestine embraced by the stricture occupy a position nearly parallel. Their contiguous sides mutually adhere; in the remainder of their circumference, they adhere to the peritoneum, lining or forming the stricture. The existing adhesion of the contiguous sides, strengthened by the adhesion of the parts in contact, insures a partial continuity upon the separation of the sphacelated part. The line of separation is the line of stricture. It commences on that side of the gut which is in direct contact with the stricture. As the separation advances, the opposite adhering sides may perhaps recede somewhat, and a little enlarge the angle of union. But it is ever after an angle; and where the peritoneum is deficient, the canal is simply covered in by granulations from the cellular

membrane of the parietes coalescing with those of the external or cellular surface of the peritoneum.”*

In consideration of these facts, and of a conviction that the ligature on a strangulated gut, or on that proportion of intestine immediately connected with the strictured part, is less likely to produce adhesion than inflammation followed by ulcer, our author decidedly prefers the more simple to the more operose modes of proceeding.

Where there is no absolute sphacelus, or only one or two small spots, as these are readily cast off either outwardly or through the canal, he advises the reduction of the bowel, and the use of fomentations, glysters and laxatives.

“Where the gangrene is general or complete, and the matters are discharged through an opening or openings in the gut, a free incision of the sac is all that appears to be required. If the spoiled gut is extensive, the surgeon may use his own judgment concerning the removal of the sloughs, for the sake of cleanliness.

“Where, under the same state of disorganization, the gut has not burst, and the process of sloughing has not commenced, an opening should be made near to the stricture, sufficient to admit of the discharge of the matters.”†

“Where the rupture is small, and the symptoms indicate the presence of gangrene, unless the patient is, strictly speaking, in articulo mortis, I would open the rupture by a free incision, treating it as an abscess, so that the fæcal matter should follow the knife.”‡

Our author thus acts on the supposition that the inflammation is confined to the strictured part. He cannot, indeed, be absolutely sure of this; but, by such conduct, he gives his patient the fairest chance of recovery. The great object is to unload the intestines: if beyond the stricture they are sound, such evacuation is the most secure mode of preventing inflammation; and if this has already begun in the belly, no more effectual means can possibly be employed to arrest its progress,

* Inquiry, &c Page 360. Mr. Lawrence has added to his second edition a somewhat similar account of this process.

† Inquiry, &c. Page 333.

‡ Ibid. 335.

nor can any means without this be efficient for the purpose. He conceives it to be highly prejudicial to sever nature's ligature, to affix his own, by drawing out the sound intestine: and he is extremely cautious in relaxing the stricture by which the mischief has been caused.

"The division of the stricture where an intestine is in a state to resume its functions is indispensable; but the object of the division where an intestine is mortified is to me unintelligible. It is in fact no longer a stricture, the resistance which made it so is taken off by the collapse of the included gut, and the patient can experience no greater relief from the division than the part itself. Nature has anticipated the surgeon; being unable to dilate the stricture, she has accommodated herself, as her custom is, to the circumstances of the case, and accomplished by other means the object of the operation. The gut has been liberated at the expence of its vitality."*

Such is the general rule, which like other general rules is not without its exception; for Mr. T. afterwards says, after opening the sphacelated gut "if the stricture should still be sufficient to retain the matters, which will seldom be the case, a moderate dilatation of it will be required."†

These operations then, do not seem to differ materially from those of Petit and Gooch, which, as we have seen, Mr. Lawrence also has preferred to the devices of more modern days. "To Mr. Lawrence of Bartholomew's Hospital," says our author, with manly and honourable candour, "who has distinguished himself by an excellent Treatise on Hernia, is due the credit of having revived the opinions, neglected or forgotten, of the illustrious Petit."‡

For the after treatment of the case Mr. Travers is very minute, and as we conceive, peculiarly judicious in his directions. We dare not however, venture to trespass any longer on the patience of our readers by quotation. He proceeds on the principle that the lower portion of the canal should be assisted to regain its functions before any attempts are made to close the external wound; a practice, we need hardly say, directly the reverse of that generally adopted. When such cau-

* Inquiry Page, 300.

† Id. 333.

‡ Id. 294.

tious treatment is pursued, Mr. T. maintains, that artificial anus is a very rare consequence either of wound or mortification.

Several interesting cases are given to shew that a state of intestine after strangulation frequently occurs, which, though short of gangrene, forms a perfect barrier to the transmission of its contents. An operation therefore, by which such an intestine is returned into the belly is fruitless; the patient dies from continued obstruction, and on examination of the body there appears no inflammation in the general cavity, but the injured gut is found precisely in the state in which it lay in the sac: this state is that of high discoloration with indentation left by the stricture. The part seems to have been paralyzed, and though it would recover its power to act in time, yet the system is unable to endure the intermediate obstruction. In this case we are directed by our author to return the bowel, for it is included in that species of hernia in which "disorganization has not commenced." We presume however, that other directions would have been given if the nature of the injury could be detected previously to the return of the gut. This however is impossible, for no change of colour can suffice to indicate such a state. The change of colour indeed, according to our author, however great it may be, is an equivocal sign of death in the bowel; though the loss of lustre affords an unerring proof of it.

The volume concludes with several curious experiments imitating the processes of strangulated hernia; and with an highly interesting case, detailed by the patient, in which a strangulated, and apparently mortified intestinal rupture, admitted of spontaneous cure without external discharge.

Our readers will perceive, that in the present instance, we have been studious to lay before them rather an analysis of the work before us, than a criticism on it. The enquiry is in truth so purely experimental, that it can only be reached by direct facts. In giving this analysis, we have also been anxious to present as full an account as possible of the general subject, consistently with our limits, that our readers might be able to estimate at one view, what has been done and by whom. This too we conceived to be the most satisfactory mode of exhibit-

ing the additions which have been made to our knowledge by the investigations of Mr. Travers.

We cannot conclude however, without a decided declaration of our belief that the present volume must become a standard authority upon the subject to which it relates, not merely from the mass of information collected in it, but from the result which it displays of numerous and important original inquiries, and from the sound sense and discretion by which these have been guided. Our author has shown a degree of zeal and activity which obstacles have served only to heighten; and a directness and soundness in reasoning, which even *his* enthusiasm has not tended to mislead.

The writer of the work before us may by some be considered an unsparing and remorseless slayer of brutes. That such slaughter is always defensible we do not assert; and we admit that it can only be defended by clear and great good resulting from it. All must abhor cruelty proceeding from malice or caprice; all will readily allow that for the more perfect gratification of our appetites, we are not authorized in tormenting inferior animals; and it may with equal truth be declared that the design of procuring scientific amusement, is a motive no less inadequate to justify us in giving them pain. Whether the pleasure procured be that of the palate, as from roasting lobsters or crimping cod, or that of satisfied curiosity, as from viewing the pulsations of the heart or the absorption of chyle in living creatures, the object is alike selfish and alike unproductive.

It is not therefore the mere name of science that will sanction such acts; and though it is true that man, considered as a race, has always a selfish object even in useful experiments on living animals, an object to benefit the race which makes them with little if any regard to the service of that which endures them, yet if the advantage be great, we conceive that he has a strong plea in his justification. In knocking down an ox for food we are sanctioned by general practice; and when we inflict pain and death on dogs to avert pain and death from man, we act on a principle precisely similar, and may plead self-preservation in excuse. It is the urgency of the case which makes the defence; and, in fact, it must be allowed, that those who save

more suffering than they give, are benefactors to the cause of life. Each act however, must be measured by a strict and jealous rule, and by such our author must be judged. In balancing the account we believe that few extensive experimental enquirers will be found to have stopped precisely at that limit which bounds their utility.

ORIGINAL PAPERS.

Observations relative to the Application of a Ligature to the Subclavian Artery in cases of Wounds and Aneurisms.—Accompanied with two Plates.

BY JOSEPH PARRISH, M. D.

No branch of surgery requires more attention than the treatment of diseases and wounds of bloodvessels, for by the timely interposition of a judicious surgeon many lives may be preserved, which without such aid would most probably be lost.

Under these impressions, I shall proceed to offer some observations relative to the Subclavian Artery—the subject has engaged my attention for several months, and I have pursued the investigation in concert with my medical friends Drs. Thomas T. Hewson, and Joseph Hartshorne. We have repeatedly dissected the parts and taken up the artery on the dead subject; having examined for the purpose, fifteen bodies, exclusive of the one which I dissected for the purpose of having a drawing taken of the parts, as presented in one of the plates accompanying this paper; and it gives me pleasure to state, that all the observations upon this truly important subject, are to be considered entirely as the result of our joint labours.

In addition to this, Dr. Hartshorne and myself have, for a considerable time, been engaged in contriving an instrument, which experience has shown may be applied to the purpose of securing the Subclavian Artery, and may also be employed with great advantage in many other situations. A very ingenious and attentive surgeon's instrument maker (John Rorer of Phila-

delphia) has made the instrument for us; and a plate of it is affixed to this communication. A more particular account of this instrument and of the mode of using it, is reserved for another place: yet it will now be proper to state, that it consists of a needle, either blunt or sharp, having two eyes, one near the shoulder, the other near the point; and above the shoulder is a male screw; this may be adapted to a steel shank fixed in a small handle, and at the end of the shank there is a female screw. Needles of various sizes may all be adapted to one handle, as the screws correspond.

The attention of the reader is particularly requested to the plate of the Subclavian Artery, &c.; as it is principally intended to supersede an anatomical description, which it was concluded would be less likely to convey a just idea of the parts: yet it will be proper to make some general observations on the dissection.

The skin and platysma-myoides, together with the omo-hyoides, were removed, also the principal part of the external jugular vein. A little dissection, and the removal of a small portion of cellular and adipose matter, brought the edge of the anterior scalenus muscle into view, and exposed the Subclavian Artery and vein, the axillary plexus of nerves, also the artery marked in the plate, superficial cervical branch, which it should be remembered is deeply situated, although the name might easily convey a different idea.

The sterno-mastoideus muscle was now detached by the scalpel from its insertion into the clavicle and sternum, and was turned aside. This fully exposed the internal jugular vein, and gave a distinct view of the point where the supra scapular vein unites with the external jugular vein. They enter by a common trunk into the subclavian vein just before it joins the internal jugular.

The dissection was continued under and also below the clavicle. The supra scapular artery, which runs under this bone, was exposed, and the subclavius muscle was removed; also the pectoralis major and minor muscles: the bloodvessels and nerves in the axilla were dissected.

A portion of the clavicle was now removed with a saw. In consequence of this, the scapula, by falling off a little distance

from the trunk, widened the space and gave a more distinct view of the parts contained in the axilla; although it produced some change in their relative situation. But, as without this removal of the clavicle it would have been impracticable to have made the wished for demonstration in one plate, it was thought best to do it.

It will be seen, that the plexus of nerves above the clavicle are separated from the artery. Instead of this, in a natural state, one of the nerves lies nearly and sometimes quite in contact with the bloodvessel.

It must also be recollected, that the removal of the clavicle, by widening the space in the axilla, makes the artery appear much more accessible in that part than is really the case. The internal jugular vein is rather preternaturally distended by the injection.

The attention of the reader is particularly requested to the situation of the subclavian vein. When it arrives at the clavicle it generally passes along and under the bone, being below and in front of the artery; and the anterior scalenus muscle acts as a septum between these two important bloodvessels. I do not recollect but one instance in the course of our dissections where the subclavian vein was found rising above the clavicle. It was in a remarkably high shouldered subject, and the sternal portion of the bone was considerably depressed.

Several attempts have been made by surgeons to take up the Subclavian Artery. Few instances are to be found on record where it has been effected.

One is related by Thomas Ramsden, assistant surgeon to St. Bartholemews Hospital, who performed the operation. It may be found at the close of an octavo volume on Sclerocele, published by that gentleman in London, 1811, to which the reader is referred: the greater part of the case was republished in the Eclectic Repertory. I shall reserve some observations on the case, with an account of the operation, for another place.

In the Surgical Dictionary of Samuel Cooper, edited by J. S. Dorsey, M. D. page 72, under the article Aneurism, we find the following:—

“A wound of the axillary* artery, might render it neces-

* Winslow gives the name of axillary to the artery immediately as it has passed from behind the anterior scalenus muscle; we have, however, ventur-

sary to do this operation. This vessel was tied by a Mr. Hall, in Cheshire, when it had been wounded with a scythe, so as to bring the ends of the artery into view; and the arm was preserved, though it remained afterwards a little weak, which indeed, might be owing to some large nerve being divided. (See *Scarpa*, p. 372.) Mr. White, of Manchester, relates another instance of this vessel being tied, in the case of a wound; but, mortification of the limb, and death followed. Three of the nerves were found included in the ligature.—*London Medical Journal*, Vol. 4.

“In a case of axillary aneurism, which had actually burst, and the hemorrhage from which could only be stopped by pressing the artery against the first rib, Mr. Keate, the surgeon-general, practised the following operation, which was attended with completely successful consequences. This gentleman determined on taking up the artery, above the diseased and ruptured part, in its passage over the first rib. Accordingly, he made an incision obliquely downwards, divided the fibres of the pectoral muscle, that were in his way, and, when he came to the artery, passed a curved, blunt-pointed, silver needle, armed double, as he conceived, under the artery, and tied two of the ends. After a careful examination, finding that the artery pulsated below the ligature, he determined on passing another ligature higher up, and nearer to the clavicle: he, therefore, passed the needle more deeply, so as evidently to include the artery. In a few days the swelling of the arm began to subside, the wound suppurated, and the ligatures came away with the dressings. The arm afterwards recovered its feeling, and the patient regained, in a great measure, the entire motion of the shoulder, &c. *Med. Review and Magazine for 1801.*”

In the case of axillary aneurism, which was successfully treated by the surgeon-general, it appears, that in the first attempt to pass the double ligature under the artery he thought he had succeeded, but, after careful examination, finding the artery pulsate below the ligature, he passed the *needle more deeply*, so as evidently to include the artery.

Now, when we recollect that the first ligature did not indeed to consider it as subclavian, following in this instance the authority of Haller, Bell, and most surgeons, who have written on this subject.

clude the artery, there is some reason to suppose that it embraced either the vein or some of the nerves; and at the second attempt, in which the needle was passed more deeply and included the artery, it probably took within its grasp some very important parts, although it is true the patient recovered. The bloodvessels and nerves are so blended below the clavicle that it appears as if it was almost impossible to discriminate between them.

The following abstract of a case of aneurism in the axillary artery is taken from the *Clinique Chirurgicale, ou Memoires et Observations de Chirurgie Clinique. Par Ph. J. Pelletan. Tome II.*

Gabriel Longpre, aged about forty years, was admitted into the hospital of the college of surgery, with an aneurism of the axillary artery of the right side.

The tumour filled the axilla, and projected forwards under the pectoralis major muscle. It pulsated with such force as to rise under the pressure of both hands.

This patient was received into the hospital more from a desire to study the nature of his disease than from any hope of effecting a cure.

By frequent examinations it was discovered, that the artery could be distinctly felt above the tumour, and that its pulsation could be entirely commanded by moderate pressure between the fingers.

The mode of operating proposed, was to make an incision through the integuments below the clavicle; then, introducing a director behind the pectoralis major, to divide all the fibres of that muscle which are attached to the clavicle.

An incision, made in this manner, would have denuded that portion of the axillary artery so easily grasped by the fingers; and a ligature might then have been passed under it with ease. On consulting the surgeons of the hospital respecting the propriety of performing this operation, one of them advised, that the pectoral muscle should not be divided; as there was some danger that the tumour would burst as soon as the support afforded by the muscle was removed.

It was determined that the muscle should not be divided,

and that some of its fibres should be included with the artery in a ligature.

After having made several unsuccessful attempts to plunge the needle through the muscle and under the artery, the operation was abandoned as impracticable.

The danger of the patient was not increased by this attempt: he died however twenty days afterward.

In contemplating the operation as attempted by the French surgeon, contrary, it appears, to his own judgment, it seems really surprising that the patient escaped from the hand of the operator as well as he did. A slight glance at the bloodvessels and nerves below the clavicle, as shewn in the plate, must be sufficient to convince any person of the extreme rashness of plunging a sharp pointed needle into such a situation; and further, that this should be done without first attempting at least, to cut through the pectoral muscle, in order to give the operator a slender chance of perceiving the danger, and, *if possible* of avoiding it, must be cause of astonishment to those who are familiar with the anatomy of the part. I shall leave any further remarks on the case with simply expressing my belief, that such practice must receive the marked disapprobation of every judicious surgeon.

An instance of an unsuccessful attempt to secure the Subclavian Artery, by that highly distinguished surgeon, Astley Cooper of London, was published in the Medical Repository of New York, by Valentine Mott, M. D., who assisted at the operation. Vide third Hexade, vol. i, page 331.

From the account of Doctor Mott it appears, that the patient was afflicted with Aneurism of the Subclavian Artery, which was very large, and had produced great alteration in the natural situation of the parts. The case was considered by Astley Cooper as very unfavourable for an operation; but the certainty of death, if no relief could be obtained, was so obvious, that the surgeon determined on giving the patient a chance; especially as the poor man was willing to submit to any thing that might be thought proper for his relief, and the uncertainty of success was candidly stated to him.

By very careful dissection above the clavicle, the surgeon

proceeded in laying bare the axillary plexus of nerves, which lay so deep that the fore finger could but just reach them. The artery was felt feebly pulsating, and covered by one of the large nerves.

A *curved probe* was now passed under the artery, and repeated attempts were made to draw it from under the nerve, so as to pass a ligature round it; but these were all unsuccessful; and, after keeping the patient on the table one hour and fifty minutes, the operation was abandoned as impracticable, and the patient died on the sixth day.

Failure in the attainment of the object, occurring to Astley Cooper, can only be attributed to insuperable obstacles connected with the case. Yet it is possible, it was rendered still more embarrassing in consequence of the inadequacy of a curved probe to the purpose of passing a ligature under an artery so situated.

As it has been previously stated that the operation has been performed by Thomas Ramsden, I shall now insert his account of the mode of doing it:

“The patient being placed upon an operating table, with his head obliquely towards the light, and the affected arm supported by an assistant at an easy distance from the side, I made a transverse incision through the skin and platysma-myoides, along and upon the upper edge of the clavicle, of about two inches and a half in length, beginning it nearest to the shoulder, and terminating its inner extremity at about half an inch within the outward edge of the sterno-cleido-mastoideus muscle. This incision divided a small superficial artery, which was directly secured. The skin above the clavicle being then pinched up between my thumb and finger and those of an assistant, I divided it from within outwards and upwards in the line of the outward edge of the sterno-cleido-mastoideus muscle to the extent of two inches.

“My object in pinching up the skin for the second incision was to expose at once the superficial veins, and by dissecting them carefully from the cellular membrane to place them out of my way without wounding them. This provision proved to be very useful, for it rendered the flow of blood during the

operation very trifling comparatively with what might otherwise have been expected; and thereby enabled me with the greatest facility to bring into view those parts which were to direct me to the artery.

“ My assistant having now lowered the shoulder* for the purpose of placing the first incision above the clavicle (which I had designedly made along and upon that bone), I continued the dissection with my scalpel until I had distinctly brought into sight the edge of the anterior scalenus muscle, immediately below the angle, which is formed by the traversing-belly of the omo-hyoideus and the edge of the sterno-cleido-mastoideus, and having placed my finger on the artery at the point where it presents itself between the scaleni, I found no difficulty in tracing it without touching any of the nerves to the lower edge of the upper rib, at which part I detached it with my finger nail for the purpose of applying the ligature.

“ Here however arose an embarrassment, which (although I was not unprepared for it) greatly exceeded my expectation. I had learned, from repeatedly performing this operation many years since on the dead subject, that to pass the ligature under the subclavian artery with the needle commonly used in aneurisms would be impracticable; I had therefore provided myself with instruments of various forms and curvatures to meet the difficulty, each of which most readily conveyed the ligature underneath the artery, but would serve me no farther; for being made of solid materials and fixed into handles, they would not allow of their points being brought up again at the very short curvature which the narrowness of the space between the rib and the clavicle afforded, and which, in this particular case, was rendered of unusual depth by the previous elevation of the shoulder, by the tumor.

“ After trying various means to overcome this difficulty, a probe of ductile metal was at length banded me, which I passed under the artery, and bringing up its point with a pair of small forceps, I succeeded in passing on the ligature, and then

* In my first incision I intentionally cut down along and upon the clavicle, as a security against wounding any superficial vessels; a very little lowering of the shoulder therefore placed the incision in the situation I wished to have it for the purpose of proceeding with the operation.

tied the subclavian artery at the part where I had previously detached it for that purpose. The drawing of the knot was unattended with pain, the wound was closed by the dry suture, and the patient was then returned to his bed.”*

While reviewing the last description of this very important operation, I have been almost irresistibly led to compare the writer to a skilful navigator, who, after having safely conducted a vessel into a very dangerous port, has given an account of the adventure, with some cursory observations for the information of others; while he has omitted to lay down in his chart some very perilous shoals, which would, most probably; prove fatal to the inexperienced mariner. After indulging for a moment in this exercise of the imagination, I wish diffidently to offer some criticisms on the subject before us.

The practice of making the transverse incision directly upon the clavicle, and also of pinching up the skin in the second incision, for the purpose of avoiding the superficial veins, is obviously proper, and must receive the approbation of every surgeon, whose primary object is to proceed consistently with the welfare of the patient, without feeling anxious to display a very unusual dexterity in the use of the knife.

At this stage of the operation, the shoulder was lowered by the assistant for the purpose of placing the first incision above the clavicle. The dissection was then continued until the edge of the anterior scalenus muscle was distinctly brought into view; and the artery was exposed, and traced with the finger

* For the purpose of drawing the ligature firmly upon the artery, T. Ramsden recommends two instruments, marked in one of his plates NN, to which the reader is referred. He states that they proved particularly serviceable in a part of the operation, where the fingers alone would have been inadequate without pulling away the artery from its attachments to a great extent.

They appear to be formed of two pieces of metal; each piece is terminated at one end in a ring of sufficient size to allow a ligature to pass freely through it—probably firm iron wire fixed in a handle would answer the purpose.

The ends of the ligature are to be passed through the rings; the operator may then gently pass the instrument down to the artery, then twisting the ligature round the instrument so as to prevent it from slipping, he firmly ties the knot.

Every surgeon who attempts the operation ought to be provided with these instruments, although it may not be necessary to use them in all cases.

to the *lower edge* of the upper rib, at which point it was secured by a ligature.

Now, when I recollect the frequent dissections made in concert with my two medical friends, I can scarcely refrain from expressing my surprise, that, really the most important difficulties likely to occur in the course of the operation, should be entirely omitted.

Upon examination of the parts, as exhibited in the plate, it will appear, that very important bloodvessels are involved in this part of the operation. The superficial cervical branch is an artery equal in size to the radial; the supra scapular artery is very little inferior in size; even the supra scapular vein would, if wounded, cause great embarrassment in the operation.

None of these vessels are even noticed; and yet all of them are unquestionably in great danger of being wounded, if, by dissection with the scalpel, the edge of the anterior scalenus muscle is brought distinctly into view.

When we advert to the extreme difficulty of securing either of these arteries, especially the superficial cervical, which is deeply situated in a part where we can have no controul over the circulation, it is really remarkable, that in a description of the operation they should not have obtained the most marked attention.

Again, the ligature was passed round the artery at the *lower edge* of the first rib. Now, I trust we shall make it appear that the *upper edge* of the first rib ought to be preferred.

Before leaving the consideration of this valuable case I wish again to request the reader to consult it at large. The observations of the writer are certainly very interesting, and his remarks on the inutility of the practice hitherto generally adopted, of deferring the operation for aneurism as long as possible, in order to allow time for the anastomosing vessels to enlarge, appear to be worthy the serious attention of every practical surgeon.

I shall now proceed to describe the mode of performing the operation, conformably to the views we have taken of the subject.

OPERATION.

After having completed the two external incisions, in the manner recommended by T. Ramsden, it is of great importance to attend to the position of the shoulder and arm. The former should be depressed as far as practicable by an assistant, who should at the same time keep the arm close to the body. The increase of space above the clavicle, produced by this movement, can scarcely be fairly appreciated by any but those who have dissected the parts, and tried the experiment for themselves.

The operator ought now to be deeply impressed with the knowledge of the fact, that the greatest degree of danger still awaits him. He should be aware of the bloodvessels which lie in the way; and that he has now only to pass through cellular and adipose matter in getting down to the fascia which covers the artery. If the handle of his scalpel and his fingers should be found inadequate to his purpose, then it is recommended that he should use a knife as narrow as the one commonly employed in the division of the cornea, with its cutting edge confined entirely to the extremity of the blade, which should be of a rounded form; in this manner he may cautiously dissect into a deep and narrow cavity without incurring the same risk of wounding the bloodvessels as would be the case if a common scalpel were employed. But instead of pursuing his dissection with a scalpel, of any description, let him now use this instrument *as little as possible*; remembering that it is not essential to his purpose to bring the edge of the anterior scalenus muscle into view: he has another and a more certain guide to conduct him to the precise point for securing the artery. To fix this point was to us a subject of considerable importance, that required and received very deliberate attention: and we are decided in our preference for the *superior edge* of the first rib. Here, as has been previously stated, the artery is situated further from the subclavian vein than in any other part, and is also as distinct from the plexus of nerves. In addition to this, the operator has a guide to conduct him precisely to the part

he is seeking for, which we believe has never been noticed by any preceding surgeon; just at the insertion of the anterior scalenus muscle into the upper edge of the first rib, there is a roughness or rather process on the bone which is very perceptible to the touch: in the generality of subjects it is so clearly defined that it cannot be mistaken. Now, instead of the operator depending on his vision to manifest the edge of the anterior scalenus muscle, he may get at the exact spot he is in pursuit of, by a reliance on the sense of touch. At this part then let the operator gently detach the artery from its surrounding connections, and then a very important object remains to be accomplished, viz. passing a ligature under the bloodvessel.

This was the part of the operation that Astley Cooper, with the instrument he used, found it impracticable to accomplish. Great difficulty was experienced by T. Ramsden, although he ultimately succeeded with a probe of ductile metal.

After very frequent trials, on the dead subject, of the instrument proposed, by Dr. Hartshorne and myself, we can recommend it as well calculated to conduct a ligature under the Subclavian Artery; and by referring to the anatomical situation of the parts, it must be obvious that a small sized blunt needle, as shewn in the plate, is most proper.

After the needle is adapted to the handle and armed with a ligature, let the operator pass the fore finger of his left hand down on the outer side of the artery and feel for the roughness or process on the superior edge of the first rib; then, with the right hand, carefully introduce the needle between the artery and vein, with its back or convex part towards the vein, and push it under the artery in a direction obliquely outward and backward. After this has been accomplished, he may easily keep the needle steady with the thumb and finger of his left hand, while, with the right hand, he quickly unscrews the handle. There is now a needle and ligature under the artery; and if it be found difficult with the thumb and fore finger to complete their passage under the bloodvessel, then the hook, marked as such in the plate, can be readily passed down into the cavity and fixed in the eye of the needle near the point. The needle and ligature may now be drawn up, and the artery tied.

The direction for passing the needle obliquely outward and backward is believed to be of considerable importance; as, by referring to the anatomical situation of the parts it will be perceived, that by pushing even a blunt needle in an opposite direction, especially in a restless patient, there would be some danger of wounding the thin coats of the subclavian vein; and even if the coats of the vein were not immediately perforated, yet it might be so injured as to inflame and slough.

The double needle is believed by Dr. Hartshorne and myself to be capable of very extensive application. The largest, or even the second sized blunt needle will be found well adapted to the purpose of conducting a ligature under the external iliac artery; while those which are pointed are specially intended for wounded arteries that are difficult of access. Thus, for example, the smallest size may be employed for the anterior tibial artery, and the second, or even the largest, may be kept in reserve during the operation for lithotomy, in case of the pudic artery being cut. By passing the needle close to the crus of the pubis and ischium from within outward the artery may in this manner, be included in a ligature.

It may be offered as an objection to this instrument, that the screw will cause embarrassment to the operator. In reply to this it may be said, that we believe experience will prove that this is not the case.

Again. The screw is liable to become oxidized. This objection requires attention, and to obviate it, the instrument should be occasionally examined and touched with oil. I have tried silver for the blunt needle, but it is not sufficiently firm.

I was informed by Joseph Cloud, a distinguished chemist in the mint of the United States, that, according to his experiments, gold and platina may be so combined as to form a metallic body sufficiently firm for the purpose of a screw; and, at a small expense a button of this could be adapted to the end of a steel shank and the female screw cut in it, which could effectually secure this part of the instrument from oxidation; or, the whole shank may be made of this metallic combination. The needle, if necessary, may be gilt with the etherized gold.

These circumstances are mentioned merely to guard against difficulties that may be suggested; as it is believed that common

steel, properly managed, will be found quite adequate to the purpose.

We have also thought of having the needle so formed as to fit into the shank without a screw; and instead of it, to have it secured by a spring: but, as this spring must be fixed in the handle, it would be liable to be touched during an operation, and the needle would be detached before the right time. This, it is true, might be obviated, by having the spring imbedded in the handle, and then covered by a clasp, which must be first opened before the spring could be touched: but it is believed that the complexity of such an instrument, and its liability to be put out of repair, would more than counterbalance any advantage which might arise from its use.

It is of importance that the portion of metal connected with the shank should extend through the handle, that it may be riveted in several places, and thus give the requisite firmness to the instrument.

The operation for securing the Subclavian Artery is at all times attended with great danger, and no surgeon should ever attempt it, who has not, by frequent dissection, made himself familiar with the anatomy of the part.

EXPLANATION OF THE PLATES.

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| A. The Humeral Portion of the Clavicle. | K. Superficial Cervical Artery. |
| B. Sternal Portion of the Clavicle. | L. Subclavian Artery. |
| C. Sterno-cleido-mastoid Muscle turned aside. | M. Supra-scapular Artery. |
| D. Anterior Scalenus Muscle. | N. Axillary Plexus of Nerves. |
| E. Arteria Innominata. | O. Axillary Artery. |
| F. Commencement of the Subclavian Artery. | P. Subclavian Vein. |
| G. Carotid Artery. | Q. Second Scalenus Muscle. |
| H. Internal Jugular Vein. | R. Axillary Vein. |
| I. Common trunk of the external Jugular Vein, and the Supra-scapular Vein. | S. Cephalic Vein. |
| | T. Basilic Vein. |
| A. The handle and shank of the instrument, having a female screw at the extremity. | H. A hook to be used in raising the needle when the vessel lies so deep that it cannot easily be reached by the fingers: the hook to be introduced into the eye near the point of the needle, after it has been passed under the artery. |
| b, c, d, e, f. Sharp and blunt needles, each of which has two eyes. | |
| G. One of the needles adapted to the shank. | |

Biographical Account of Dr. Pitcairn.

[From the London New Medical and Physical Journal for August 1811.]

DAVID PITCAIRN, M. D. F. R. S. F. A. S. Fellow of the College of Physicians of London, and Physician Extraordinary to the Prince of Wales, was the eldest son of the gallant Major John Pitcairn, of the marines, who was killed in the

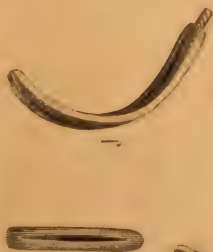


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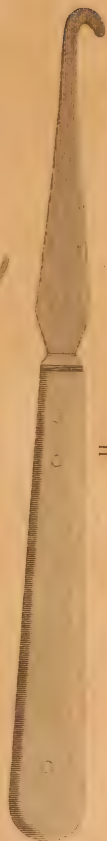
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V



II



III

attack upon Bunker's Hill, in June 1775, and Elizabeth, the daughter of Robert Dalrymple, Esq. of Annefield, in the county of Dumfries. His paternal family was one of the most ancient in Fifeshire, deriving its name from a landed possession called Pitcairn.

Dr. David Pitcairn was born on the 1st of May, 1749, in the house of his grandfather, the Rev. David Pitcairn, minister of Dysart, in the county of Fife. When about nine or ten years old, he was sent to the high school at Edinburgh, where he remained four years; after which he went to the university of Glasgow, and prosecuted his studies there till he arrived at the age of twenty. At this period of his life he used to spend much of his leisure time with the family of the Rev. James Baillie, minister of Bothwell, in the county of Lanark, and father of the celebrated dramatic writer, Miss Johanna Baillie. During this intercourse commenced an affectionate intimacy between Dr. Pitcairn and Dr. Baillie, which afterwards, as the difference of their years became less in proportion to their ages, gradually changed into the warmest friendship, that continued ever afterwards. It being now determined that he should be a physician, he went, in 1769, to the university of Edinburgh, and studied medicine there for three years, under the immediate direction of the illustrious Cullen. In 1772 he came to London, and attended the lectures of his uncle's learned friends, Dr. W. Hunter and Dr. G. Fordyce. About the same time also, that he might attain an English degree in physic, though he was then nearly twenty-three years old, he entered at Bennet College, Cambridge. In 1780, several years before he received his Doctor's degree, he was elected physician to St. Bartholomew's hospital; and about the same time may be placed the commencement of his private medical practice. In 1792 he was chosen physician to Christ's hospital; and in the following year, his private practice being now considerable, he resigned the office of physician to St. Bartholomew's hospital. His office at Christ's hospital demanded but little of his time, and was therefore retained by him several years longer.

By the death of Dr. Warren, which took place in June 1797, Dr. Pitcairn was placed at the head of his profession in London. One or two other physicians possibly derived as much pecuniary emolument from the practice of medicine as him-

self; but certainly no other was so frequently requested by his brethren to afford his aid in cases of difficulty. But this prosperous state did not endure long. In the autumn of the same year, he fell from his horse and bruised his side. Shortly after, his heart began to beat with violence, and his attention was more particularly directed to this symptom, as it had occurred in one of his brothers likewise in consequence of a fall, whose heart after death was found considerably enlarged. He continued, however, to follow his profession till February in the following year, when he was attacked with a hæmorrhage from his lungs. From this he recovered, after some time, so far as to be enabled to resume the exercise of his profession; but the same disease having recurred in summer, he embarked in September for Lisbon. During a stay of more than eighteen months in Portugal, he had no return of the hæmorrhage, in consequence of which he ventured to come back to his country in May, 1800. He was still feeble; and his heart was beating too forcibly; he for some time, therefore, declined altogether engaging in medical practice. Afterwards, as his own health improved, he began to receive patients at his house; then to meet other physicians in consultation at the houses of their patients; and at length, after an interval of several years, to undertake the entire care of sick persons at their own homes, except during four months of the latter part of the year, which he spent almost wholly in the country. In the mean time, however, the palpitation of his heart continued; on which account he for a long time lived very abstemiously, drinking only water, and abstaining almost entirely from animal food. But, as the beating did not increase, and no other sign of a diseased heart existed, and as he found a vegetable diet to produce in him much flatulence, about a year or two before his death he began to eat moderately of animal food once a day, and to take sometimes after dinner a single glass of wine diluted with water.

Under this change of regimen his appearance altered considerably, and, during the last six months of his life, he frequently received the congratulation of his friends on the improvement which his health had undergone. Disregarding the advice given by one of the masters of our art, "*si plenior aliquis, et coloratior, factus est, suspecta habere bona sua debet,*" he seemed to look upon his increased strength as a permanent

acquisition, and as chiefly valuable from enabling him to bear an increase of professional labour. In the course of the month of March, for instance, he rose several times from his bed soon after midnight, and travelled between twenty and thirty miles before morning, to visit a patient. From these exertions, however, he appeared to suffer no immediate injury. But about the beginning of April, he found that he was heated by his single glass of wine, though diluted largely with water, and therefore discontinued it.

On the 13th he felt a soreness in his throat, but thought so lightly of it, that he continued his professional visits during that and the two following days. In the night of the 15th, his throat became worse, in consequence of which he was copiously bled, at his own desire, and had a large blister applied over his throat; but the irritation occasioned by the latter remedy was so distressing to him, that it was removed before its intended effect was fully produced.

On the evening of the 16th, Dr. Baillie called upon him, without knowing that he was ill; and having heard the history of his ailment, and an account of the remedies employed, he entirely approved of what had been done. At this time Dr. Baillie observed no symptom which indicated danger. The disease becoming more violent in the course of the night, a considerable number of leeches were applied to the throat early in the morning. Dr. Baillie visited him at eleven o'clock in the forenoon. His countenance was now sunk, his pulse feeble and unequal, his breathing laborious, and his voice almost lost, from the swollen state of the parts concerned in its formation. In this state he wrote upon a piece of paper, that he conceived his windpipe to be the principal seat of the disease, and that this was the croup. Mr. Home was also present; and it was agreed that an attempt should be made to give relief by wounding the tonsils. This was accordingly done; some blood issued, but nothing purulent. Both the patient, however, and those about him, conceived that he had derived benefit from the operation. Dr. Baillie saw him again between four and five in the afternoon, and thought his situation much improved; for the pulse was now equal and more firm, and his general appearance indicated less debility and distress. Under this persuasion he left him, having previously agreed to return at ten in the

evening, when he was to meet in consultation Mr. Home and another physician, who had long been intimate with his patient. A little before Dr. Baillie had paid the visit just mentioned, a slight drowsiness had come on, and this symptom rather increased after his departure. But nothing more remarkable occurred till near eight o'clock, when the patient's breathing became suddenly more difficult. About 20 minutes after this he died.

The body was examined the second day after death by Mr. Home, Dr. Baillie, and Dr. Wells. The throat and tongue were found much inflamed and swollen. The inner membrane of the trachea was also found inflamed, but altogether free from that preternatural coating which occurs in croup. The heart and lungs were entirely sound; but the aorta, close to its origin, was somewhat diseased; sufficiently, perhaps, to occasion in a person of an irritable frame, an increased force in the pulsations of the heart, though apparently not in such a degree as to affect the duration of life. On the 25th his corpse was deposited in a vault in the church of St. Bartholomew, near Smithfield, which contained the remains of his father and uncle.

In 1781, he married Elizabeth, the only daughter of William Almack, Esq. of London, and a niece of his preceptor, Dr. Cullen; but had no issue.

His person was tall and erect, but of late years rather thin; his countenance during youth was a model of manly beauty, and even in advanced life was remarkably handsome. His memory was strong, and his judgment sound; whatever, therefore, he learned, was retained and well assorted; so that in time he excelled most of those who had once been regarded his superiors. His knowledge of history and geography, from the strength of his memory, was particularly accurate.

Few persons ever gained, without any direct effort to this end, so extensive an acquaintance with the various orders of society. His education began at the largest school in Great Britain. He afterwards studied for several years at each of the great Universities of Glasgow, Edinburgh, and Cambridge, and attended the principal lectures on medicine in London. While a young man in London he lived with his uncle, who had many friends, and frequently entertained them at his house. He resided many years in Lincoln's Inn Fields; and, while

there, associated daily with gentlemen of the law. He was early admitted a Fellow of the Royal and Antiquarian Societies, and hence knew many learned men, in addition to those of his own profession. He was fond of country sports and athletic games, particularly the Scottish one named golf which carried him among other sets of men. He had a taste also for the fine arts, in consequence of which he became acquainted with many of the professors of them; and his employment as a physician in the largest hospital in the kingdom, as well as in private practice, made known to him a very great number of persons of every rank and description in life. From such opportunities, possessing an original turn for the observations of character, he obtained a most extensive knowledge of human nature, and an infinite fund of stories and anecdotes, which, when at ease among his friends, he used to relate in the happiest way. In conversation he shunned disputes. When he dissented from others, he either declared his opinion in few words, or remained altogether silent. With literary men his value as a companion was considerably increased by his judgment in selecting, and lively mode of repeating, passages from new works of taste, most of which he read immediately after they were published. But, though he had lived so much in society, he never entirely lost a natural shyness of manner, which was more observable at sometimes than at others. This was often imputed, by those who did not know him, to pride; though, in truth, it seemed to arise from a diffidence of his own merit. As he advanced in years his manners became less reserved to strangers; for, to his friends, they had always been frank and affectionate.

His feelings were warm, and he was sometimes betrayed by them into little improprieties; but this disadvantage was greatly outweighed by the energy which was hence given to his character, and the interest which he hence took in the happiness of others. It may be regarded, perhaps, as no inconsiderable title to praise, that he behaved with the utmost kindness and generosity towards his numerous relations. But his endeavours to serve were not confined to these. He was ever ready to assist his friends in their pursuits, not only by his advice, but by his influence with others, and the sacrifice of his time; to say nothing of other aids which he frequently furnish-

ed. Like other men of warm tempers, he was apt to bestow upon his present pursuits more than their due importance; and, as increase of years and professional employment, together with great varieties in the state of his health, necessarily produced alterations in his views of life, he was hence thought by some to be of a changeable disposition, but this was never said respecting his attachment to persons. He continued to the last, loving his first friends, and he was, in return, most cordially beloved by them.

His manner, as a physician, was simple, gentle, and dignified, and always sufficiently cheerful to encourage hope, without offending by its incongruity with the scene about him. From his kindness of heart, he was frequently led to give more attention to his patients than could well be demanded from a physician; and as this evidently sprung from no interested motives, he often acquired considerable influence with those whom he had attended during sickness. No physician, indeed, of his rank in London, perhaps, ever exercised his profession to such a degree gratuitously. His behaviour to other physicians was highly candid and liberal, and he most studiously avoided the slightest appearance of interfering in their professional concerns. Such conduct is, no doubt, recommended by its ultimate utility; but in him it arose from a native sense of honour that appeared in every other transaction of his life.

As he attended very carefully to the symptoms of diseases, in the order and degree in which they occur in nature, he had, from this source, and the excellence of his memory, acquired great practical knowledge of his profession. He had, in consequence, also made many original observations upon the history and treatment of diseases. He was, for instance, the first who took notice of the connection between rheumatism of the external parts of the body, and a certain affection of the heart, which he hence called rheumatism of that organ. Since it was mentioned by him, numerous examples of it have been seen by others, which puts the justness of the observation beyond doubt, though no trace of it exists in any author prior to Dr. Baillie, to whom he had communicated it. He never published any of his observations himself: but several, besides that which has just been spoken of, have been given to the world by others.

MEDICAL AND PHILOSOPHICAL INTELLIGENCE.

The National Vaccine Establishment.

[From the Monthly Magazine, for October, 1812.]

THE following satisfactory Report to the Secretary of State, was lately made by Drs. Millner and Hervey, relative to the progress and success of the Vaccine Inoculation.

The Board of the National Vaccine Establishment have the honour of reporting that, during the year 1811, the surgeons appointed by their authority to the nine stations in London, have vaccinated 3,148 persons, and have distributed 23,794 charges of vaccine lymph to the public. The number vaccinated this year rather exceeds that of the year 1810, and the demand for lymph has been often so great that it could not be immediately supplied.

They have great satisfaction in stating, that, since the commencement of this establishment, not a single instance of the accession of small-pox, after vaccination, has occurred to any of the vaccinating surgeons of the nine stations.

The Board report, that they have been lately furnished with many satisfactory official documents from the naval and military departments of government, respecting the progress of vaccination, and have likewise obtained some other authentic papers on the subject, containing much important information. They think it expedient to lay before you a summary of their contents.

It appears, that, in consequence of an order from the Lords Commissioners of the Admiralty, vaccination has been practised in the navy to a great extent; and, although it has not been universally adopted, the mortality from the small-pox, among seamen, is already greatly diminished.

In the army, the practice of vaccination has been long established, by an order from the Commander in Chief, and its effects have been decidedly beneficial; for almost the only persons among the troops who have lately been affected with small-pox, have been either recruits, who had received the infection previous to their enlistment, or soldiers who had not

been vaccinated, on the supposition of their having had the variolous disease. Thus, with a few exceptions, a disorder formerly so fatal to the troops, is now considered as nearly extinguished in the army.

By information transmitted to the Board from their numerous correspondents in all parts of the country, it appears, that vaccination is almost every where gaining ground, throughout the British dominions, though its progress is very different in different places; and it is found, that the number of deaths from the small-pox is uniformly decreasing, in proportion as vaccination becomes more general, and the inoculation of the small-pox declines.

The disappearance of the small-pox from the island of Ceylon, was noticed in the Report of last year; and the Board has now the pleasure of stating, from sources of authentic and satisfactory information, that, in consequence of vaccination, this dreadful disease has in no instance lately occurred in the island of Anglesey, in the populous city of Newcastle-upon-Tyne, in the town of Petworth, or in the adjoining district.

Through the different counties of England, the practice of vaccination is becoming general, and the small-pox is gradually declining; and even in London, where the opposition to the new inoculation has been most violent, it is prevailing, and its salutary effects are becoming daily more evident. At present, by the best estimate we are able to make, it appears that nearly two-thirds of the children annually born in the metropolis, are vaccinated either by charitable institutions or private practitioners; and that the number of deaths by small-pox has proportionally decreased. Previous to the discovery of vaccination, the average number of deaths by small-pox within the bills of mortality, was 2,000 annually; whereas, in the last year, only 751 persons have died of that disease, although the increase of population within the last ten years has been 133,139. The increase of population throughout Great Britain, in the same period of time, has been 1,609,000; and to these augmentations the practice of vaccination has probably much contributed.

The Reports from the Cow-pock Institution in Dublin, are of the most favourable nature, and furnish sufficient reason to

believe, that, since the introduction of the vaccine preventive, the mortality from small-pox has considerably declined in that city. The correspondence of the Institution affords satisfactory evidence of the progressive increase of vaccination throughout Ireland. In most of the principal towns of that kingdom, the poor have the advantage of gratuitous inoculation with cow-pox, either at the hospitals, or at the houses of the physicians; and it is stated, that, among the higher ranks, vaccination is universally adopted.

The accounts from Scotland, particularly those from the faculty at Glasgow, which have been transmitted to the Board, furnish evidence of the general and rapid increase of vaccination in the northern part of the island, and give the most satisfactory proofs of the success and efficacy of the practice.

Notwithstanding the incontrovertible evidence of the very great advantages of vaccination, it is much to be lamented that there are still some medical practitioners, though the number of them is comparatively small, who obstinately persist in disseminating by inoculation the contagion of the small-pox, and who strenuously encourage and support, especially among the lower orders of the people, the prejudices against the new practice; rumors are industriously spread abroad, of deforming and loathsome diseases produced by this practice; and numerous mis-statements of cases are published, of the occurrence of small-pox after vaccination. That, in some instances, the small-pox has affected persons who have been most carefully vaccinated, is sufficiently established; nor ought we to be surprised at this, when we consider that the inoculation for the small-pox sometimes fails, and that several cases may be produced, in which persons have been affected with the natural disease more than once in the course of life. The number of instances of small-pox after vaccination, however, is very small; and we may fairly presume, that in proportion as improvements are made in the practice, such occurrences will be still more rare.

The Board have infinite satisfaction in stating the two following important and decisive facts in proof of the efficacy and safety of vaccination, viz. that, in the cases which have come to their knowledge, the small-pox, after vaccination, with a

very few exceptions, has been a mild disease; and that, out of the many hundred thousand persons vaccinated, not a single well-authenticated instance has been communicated to them, of the occurrence of a fatal small-pox after vaccination.

They cannot conclude their Report, without adverting to the mischiefs which are daily arising from the diffusion of the fatal contagion of small-pox in the community, in consequence of variolous inoculation, among the lower classes of the people, which constantly keeps up the contagion, and, where it saves a single life, exposes numbers to a most dangerous disease. It is greatly to be wished that this evil could be checked, by such measures as government in its wisdom might judge proper to frame, in order to prevent the spreading of the small-pox, and thus keeping up a continual source of infection in the heart of the metropolis.

Part I. of the Philosophical Transactions of the Royal Society for 1812 has just made its appearance. The following are its contents:

1. On the grounds of the Method which Laplace has given in the second Chapter of the third Book of his *Mécanique Céleste* for computing the Attractions of Spheroids of every Description. By James Ivory, A. M. Communicated by Henry Brougham, Esq., F.R.S. M.P.—2. On the Attractions of an extensive Class of Spheroids. By J. Ivory, A.M. Communicated by Henry Brougham, Esq. F.R.S. M.P.—3. An Account of some Peculiarities in the Structure of the Organ of Hearing in the *Balæna Mysticetus* of Linnæus. By Everard Home, Esq., F.R.S.—4. Chemical Researches on the Blood, and some other Animal Fluids. By William Thomas Brande, Esq., F.R.S. Communicated to the Society for the Improvement of Animal Chemistry, and by them to the Royal Society.—5. Observations of a Comet, with Remarks on the Construction of its different Parts. By William Herschel, LL.D. F.R.S.—6. On a gaseous Compound of carbonic Oxide and Chlorine. By John Davy, Esq. Communicated by Sir Humphrey Davy, Knt., LL.D., Sec. R.S.—7. A Narrative of the

Eruption of a Volcano in the Sea off the Island of St. Michael. By S. Tillard, Esq., Captain in the Royal Navy. Communicated by the Right Hon. Sir Joseph Banks, Bart. K.B.P.R.S.—8. On the primitive Crystals of Carbonate of Lime, Bitter-Spar, and Iron-Spar. By William Hyde Wollaston, M.D. Sec. R.S.—9. Observations intended to show that the progressive Motion of Snakes is partly performed by means of the Ribs. By Everard Home, Esq. F.R.S.—10. An account of some Experiments on the Combinations of different Metals and Chlorine, &c. By John Davy, Esq. Communicated by Sir Humphrey Davy, Knt. LL.D. Sec. R.S.—11. Further Experiments and Observations on the Action of Poisons on the Animal System. By B. C. Brodie, Esq. F.R.S. Communicated to the Society for the Improvement of Animal Chemistry, and by them to the Royal Society.

It is a curious fact, observe the Editors of the Monthly Magazine, that the schedule to the new Medicine Act contains the names and titles of between *five and six hundred Quack Medicines!* The principal object of the bill was, however, to render liable to the *stamp duty* and *revenue laws*, “all “artificial mineral waters, and all waters impregnated with “soda, mineral alkali, or carbonic acid gas.”

Monthly Mag. October 1812.

Mr. Brodie has read a paper on Animal Heat to the Royal Society, tending to confirm some of his remarks on this subject in his former communications. He animadverted on the inadequacy of Black's Theory, and the inaccuracy of Crawford's Experiments; showed that by artificial respiration, animal bodies deprived of the brain cool faster than when left alone, although an equal portion of oxygen is absorbed, and carbon disengaged in the process, as when the animal was living; and he hence inferred, that the action of the brain and nerves is necessary to the production of animal heat.

Monthly Mag. October 1812.

Statement of the situation and occurrence of Hernia at different periods of Life. By John Taunton, Esq.

The following statement of the situation and occurrence of Hernia at different periods of life, has been obtained principally from patients relieved by the City of London Truss Society, by John Taunton, Esq. Surgeon to the Society, within the short period of four years and a half.

In 3,176 patients, 2,702 were males, and 474 were females. The situation of the hernia in each case will be seen in the following table:

704	Left inguinal	}	1,910 inguinal	}	2,194 Single.
1,206	Right inguinal				
154	Left femoral	}	284 femoral	}	
130	Right femoral				
728	Double inguinal	}	. . . . .		792 Double.
64	Double femoral				
172	Umbilical	}	. . . . .		190
18	Ventral				
<hr/>					
3,176					<hr/> 3,176

202 Patients were relieved with trusses, under 10 years of age.

160	Ditto	between 10 and 20	ditto.
310	Ditto	. . . . . 20 and 30	ditto.
596	Ditto	. . . . . 30 and 40	ditto.
632	Ditto	. . . . . 40 and 50	ditto.
664	Ditto	. . . . . 50 and 60	ditto.
432	Ditto	. . . . . 60 and 70	ditto.
168	Ditto	. . . . . 70 and 80	ditto.
10	Ditto	. . . . . 80 and 90	ditto.
2	Ditto	. . . . . 90 and 100	ditto.

3,176

From the most accurate estimation which he has been enabled to make, he has no doubt of this malady existing in one person in eight throughout the whole male population of Great Britain, and even in a much greater proportion among the labouring classes of the community, in manufacturing districts, particularly in those persons who are employed in weaving.

Tilloch's Philos. Mag. June 1812.

Dr. Bateman has been engaged for some time past, in preparing for publication, a short treatise on the Diseases of the Skin, according to the lucid arrangement devised by the late Dr. Willan, which is calculated to teach accuracy in the discrimination of the appearances of eruptive disorders, and to render the language in this department of medicine clear and definite. From a long connection with the same public institution with Dr. Willan, and from direct personal communication on these topics, Dr. Bateman will be enabled to include in his Synopsis, a view of the unfinished parts of the classification, as well as of those already before the public.

Monthly Mag. August 1812.

From Mr. Montagu's researches on the Constitution of Sponges, it appears, that no polype, or vermes of any kind are to be discerned in their cells or pores; they are, however, decidedly of an animal nature, and possess vitality without perceptible action or motion! Mr. Montagu has divided the genus *Spongia*, into five families, viz. branched, digitated, tubular, compact, or orbicular. Only fourteen species were previously known, but Mr. Montagu has described no fewer than thirty-nine.

Ibid.

An account of the Life and Discoveries of the celebrated Cavendish, has been lately read by Chaptal at a sitting of the National Institute of France.

Monthly Mag. October 1812.

ROYAL SOCIETY.

Mr. Brodie has extended his experiments on poisons to those of the mineral kingdom, and his valuable paper was read to the Royal Society on the 27th of February last.

Since (says he) I had the honour of communicating to the Royal Society some observations on the action of certain poisons on the animal system, I have been engaged in the further prosecution of this inquiry. Besides some additional experiments on vegetable poisons, I have instituted several with a view to explain the effects of some of the more powerful poisons of the mineral kingdom. The former correspond in their

results so nearly with those which are already before the public, that, in the present communication, I shall confine myself to those which appear to me to be of some importance, as they more particularly confirm my former conclusions respecting the recovery of animals apparently dead, where *the cause of death operates exclusively on the nervous system*. In my experiments on mineral poisons, I have found some circumstances wherein their effects differ from those of vegetable poisons, and of these I shall give a more particular account.

Experiments with the Woorara.—In a former experiment, I succeeded in recovering an animal, which was apparently dead, from the influence of the essential oil of bitter almonds, by continuing respiration artificially until the impression of the poison upon the brain had ceased; but a similar experiment on an animal under the influence of the woorara was not attended with the same success.

On the Effects of Arsenic.—When an animal is killed by arsenic taken internally, the stomach is found bearing marks of inflammation; it is a very general opinion,—1, that this inflammation is the cause of death: 2, that it is the consequence of the actual contact of the arsenic with the internal coat of the stomach. But in several cases I have found the inflammation of the stomach so slight, that on a superficial examination it might have been easily overlooked; and in most of my experiments with this poison, death has taken place in too short a time for it to be considered as the result of inflammation: and hence we may conclude, that the first of these opinions is incorrect; at least as a general proposition.

Many circumstances conspire to show that the second of these opinions also is unfounded.

In whatever way the poison is administered, the inflammation is confined to the stomach and intestines; I have never seen any appearance of it in the pharynx or œsophagus.

The symptoms produced by arsenic may be referred to the influence of the poison on the nervous system, the heart, and the alimentary canal. As of these the two former only are concerned in those functions, which are directly necessary to life, and as the alimentary canal is often affected only in a slight degree,

we must consider the affection of the heart and nervous system as being the immediate cause of death.

In every experiment which I have made with arsenic, there were evident marks of the influence of the poison on all the organs which have been mentioned; but they were not in all cases affected in the same relative degree. In the dog, the affection of the heart appeared to predominate over that of the brain, and on examining the thorax, immediately after death, this organ was found to have ceased acting and in a distended state. In the rabbit, the affection of the brain appeared to predominate over that of the heart, and the latter was usually found acting slowly and feebly, after the functions of the brain had entirely ceased. In the rabbit, the effects of the arsenic on the stomach and intestines, were usually less than in carnivorous animals.

The action of the arsenic on the system is less simple than that of the majority of vegetable poisons. As it acts on different organs, it occasions different orders of symptoms; and, as the affection of one or another organ predominates, so there is some variety in the symptoms produced even in individual animals of the same species.

In animals killed by arsenic, the blood is usually found fluid in the heart and vessels after death, but, otherwise, all the morbid appearances met with on dissection, are confined to the stomach and intestines. As this is the case, and as the affection of these organs occasions remarkable symptoms, it may be right to mention the result of my observations on this subject.

Experiments with the Muriate of Barytes.—When barytes is taken into the stomach, or applied to a wound, it is capable of destroying life; but, when in its uncombined state, its action is very slow. The muriate of barytes, which is much more soluble than the pure earth, is (probably on this account) a much more active poison.

On the Effects of the Emetic Tartar.—The effects of the emetic tartar so much resemble those of arsenic and of muriate of barytes in essential circumstances, that it would be needless to enter into a detail of the individual experiments made with this poison.

On the Effects of the Corrosive Sublimate.—When this poison is taken internally in very small and repeated doses, it is absorbed into the circulation, and produces on the system those peculiar effects which are produced by other preparations of mercury. If it passes into the circulation in larger quantity, it excites inflammation of some part of the alimentary canal, the termination of which may vary, accordingly as it exists in a greater or less degree. When taken in a larger quantity still, it occasions death in a very short space of time. I had found, that, if applied to a wounded surface, it produced a slough of the part to which it was applied, without occasioning any affection of the general system. This led me to conclude, that the effects of it, taken internally and in a large quantity, depended on its local action on the stomach, and were not connected with the absorption of it into the circulation.

That a sudden and violent injury of the stomach should be capable of thus speedily proving fatal, is not surprising, when we consider the powerful sympathy between it and the organs on which life more immediately depends, and the existence of which many circumstances in disease daily demonstrate to us.

The facts which have been stated, appear to lead to the following conclusions respecting the action of the mineral poisons which were employed in the foregoing experiments.

1. Arsenic, the emetic tartar, and the muriate of barytes, do not produce their deleterious effects until they have passed into the circulation.

2. All of these poisons occasion disorder of the functions of the heart, brain, and alimentary canal; but they do not all affect these organs in the same relative degree.

3. Arsenic operates on the alimentary canal in a greater degree than either the emetic tartar, or the muriate of barytes. The heart is affected more by arsenic than by the emetic tartar, and more by this last than by the muriate of barytes.

4. The corrosive sublimate, when taken internally in large quantity, occasions death by acting chemically on the mucous membrane of the stomach, so as to destroy its texture; the organs more immediately necessary to life being affected in consequence of their sympathy with the stomach.

In making the comparison between them, we observe that the effects of mineral are less simple than those of the generality of vegetable poisons; and, when once an animal is affected by the former, there is much less chance of his recovery than when he is affected by the latter. *Monthly Mag. June 1812.*

Vaccine Society.

THE Physicians of the Society have continued their attention to the Vaccination of the poor in the city and districts. The number of persons who have passed through the process successfully, under the care of the society, from its first institution in 1809, is as follows:

1809	. . . . .	1102 persons
1810	. . . . .	955
1811	. . . . .	1277
1812	. . . . .	1255
Total		4589

And it is with peculiar satisfaction that we can announce, that, as far as we know, no instance of Small-Pox has occurred in Philadelphia during the present year.

Philadelphia Dispensary.

From the annual Report of the Managers, we find that from December 1, 1811, to December 1, 1812, three thousand, three hundred and sixty-nine patients have been attended by the physicians of this charity.

Remaining under care from last year,	. . .	70
Admitted since last year,	. . .	3299
Of whom the number cured is,	. . .	3098
relieved,	. . .	64
dead,	. . .	83
removed,	. . .	22
irregular,	. . .	21
remaining under care,	. . .	81
		3369

The receipts of moneys by the institution during the year, including last year's balance in the treasurer's hands, have been, Dolls. 6098 07

The expenditures have been, Dolls. 6060 57
 Balance in treasurer's hands, Dec. 22, 1812. 37 50
 ----- 6098 07

METEOROLOGICAL OBSERVATIONS.

State of the weather, &c. at Philadelphia, during the last six months of 1812.

JULY.

Thermometer—Lowest, at 8 A. M. 60, 1st day of the month.

Highest, at 3 P. M. 83, 6th.

Mean, 72.

Winds—Westerly winds prevailed.

A pleasant month, cool, and very fine harvest—as to the quantity and quality of the grain, and well got in.

AUGUST.

Thermometer—Lowest, at 8 A. M. 60, 27th and 28th days of the month.

Highest, at 3 P. M. 80, 21st.

Mean, 70.

Winds—Easterly winds most prevalent.

August, like the two preceding summer months has been remarkably cool—the summer in general has been remarked by a careful observer to be the coolest he has remembered during a long life—the mercury never having rose above 83 degrees—whereas it generally rises to about 90 degrees more or less—some heavy rains in this month. A most violent and destructive hurricane at New Orleans on the 19th day of this month.

SEPTEMBER.

Thermometer—Lowest, at 8 A. M. 49, 21st day of the mo.

Highest, at 3 P. M. 77, 14th.

Mean, 60.

Winds variable—mostly northerly.

The weather uniformly cool and moderate,—little rain,—fres kept in the last week,—no equinoctial gale.

OCTOBER.

Thermometer—Lowest, at 8 A. M. 40, 9th day of the month.

Highest, at 3 P. M. 71, 2d and 3d.

Mean, 54.

Winds—Southerly and westerly.

The weather has been temperate,—not much rain.

NOVEMBER.

Thermometer—Lowest, at 8 A. M. 28, 25th day of the mo.

Highest, at 3 P. M. 63, 5th.

Mean, 40.

Winds—Westerly.

Weather cool,—little rain,—a violent storm from the south-east in the night of the 23d and morning of the 24th—the wind suddenly changed to northwest, and blew with a force seldom experienced.—Many newly built houses and many chimnies were blown down. On the eleventh day of this month a severe shock of an earthquake was experienced at Kingston in Jamaica.

DECEMBER.

Thermometer—Lowest, at 8 A. M. 23, 12th, day of the mo.

Highest, at 3 P. M. 48, 4th.

Mean, 30.

Winds—Westerly winds uncommonly prevalent.

A small quantity of snow on the 9th. Floating ice in the river on the 15th and 17th and considerable obstruction to navigation from ice in the last week of this month. Scarcely any rain for four weeks.

For the last six months of the year, the city has been healthy. In the latter part of the summer and beginning of autumn, a Typhus Fever has been very prevalent in the country, chiefly in Chester county, which often proved mortal. The Small-Pox has not been known in this city for the last twelve months.

RECENT BRITISH PUBLICATIONS.

Physiological Reflections on the Destructive Operation of Spirituous and Fermented Liquors on the Animal System. By J. Forster. 2s. 6d.

Treatise on the Influence of Climate on the Human Species. By D. Petta. octavo.

An Explanation of the Cause why Vaccination has sometimes failed to prevent Small-Pox; and also the Description of a Method confirmed by Experience of obviating such Causes. By Edward Leese. 8vo. 2s. 6d.

Pharmacologia; or the History of Medical Substances, in order to enable the Practitioner to prescribe them with efficacy

and elegance, and to dispense them with accuracy. By John Ayrton Paris, M. B. F. L. S. 12mo. 8s.

Elements of Agricultural Chemistry, in a Course of Lectures delivered before the Board of Agriculture. By Sir Humphrey Davy. Illustrated with Plates, engraved by Laurie.

Observations on the Nature and Treatment of Tinea Capitis, or Scald Head; and on Impaired Vision arising from Opacity of the Cornea. By Thomas Luxmoore.

Description of the Arteries, with copious Notes. By John Barclay, M. D. &c.

A Treatise on the Dolichos-Pruriens. By Chamberlaine. 10th edition.

Tirocinium Medicum, on the Duties of Youth in the Prosecution of their Studies in the Medical Profession.

A Series of Plates on the Brain, with References exhibiting the appearance of that Organ in the different Stages of Dissection. By Alexander Ramsay, M. D. Edinburgh. 4to. 1l. 1s.

Outlines of Natural Philosophy; being Heads of Lectures delivered in the University of Edinburgh. By John Playfair, Professor of Natural Philosophy in the University of Edinburgh. 1 vol. 8vo. 9s.

On the Uncertainty of the Signs of Murder in the Case of Bastard Children. By J. Hunter. 1s. 6d.

Practical Observations on the Ectropium or Eversion of the Eyelids, with the Description of a new Operation for the Cure of that Disease. By William Adams. Illustrated by coloured Plates. 8vo. 14s. boards.

A Treatise on Veterinary Medicine. By James White, of Exeter, late Veterinary Surgeon to the First or Royal Dragoons. The third vol. 12mo. 6s.

Remarks on Baths, Water, Swimming, Shampooing, Heat, Hot, Cold and Vapour Baths. By M. L. Este, Esq. 3s. 6d. sewed.

Synopsis Plantarum Succulentarum. By W. Haworth, cr. 8vo. 10s. 6d.

Count Rumford's seventeenth and eighteenth Essays; the first on the Source of Light which is manifested in the Combustion of Inflammable Bodies. 1s. The other on the excellent Qualities of Coffee, and the Art of making it in the highest perfection. 4s.

An Essay on the Influence of Tropical Climates, particularly that of India, on European Constitutions: the principal Effects and Diseases induced thereby; with the means of obviating and removing them. By Joseph Johnson, Esq. Surgeon in the Royal Navy.

A Botanical Materia Medica; consisting of the Generic and Specific Characters of the Plants used in Medicine and Diet, with Synonyms and References to Medical Authors. By Jonathan Stokes, M. D. 4 vols. octavo. 3/.

PROPOSED BRITISH PUBLICATIONS.

Dr. Alexander Monro, jun. has in the Press, Outlines of the Anatomy of the Human Body, in its sound and diseased state, in three octavo volumes. Illustrated by forty-four Engravings. By Heath, Mitchell, &c. from original Drawings of Dr. Peter Camper, Messrs. Fyfe, Syme, and Lezars.

Fauna Orcadensis, or the Natural History of the Quadrupeds, Birds, Reptiles, and Fishes, of Orkney and Shetland. By the Rev. G. Low, Minister of Biza and Harzy, is printing in quarto.

Engravings from Specimens of morbid parts of the Urethra, &c. preserved in Mr. Charles Bell's Collection, Windmill Street, are nearly ready for publication, and will appear in four fasciculi, of ten Plates each, in folio.

The African Institution intend to publish the last Journals received from Mr. Park, with the Narrative of Isaac his companion, for the Benefit of Mr. Park's widow.

RECENT AMERICAN PUBLICATIONS.

Professor Cullen's Treatise of the Materia Medica, with large additions, including many new articles wholly omitted in the original work. By Benjamin Smith Barton, M. D. one of the physicians to the Pennsylvania Hospital, and Professor of Materia Medica, Natural History, and Botany, in the University of Pennsylvania. 2 vols. 8vo. E. Parker, Philadelphia.

Medical Inquiries and Observations upon the Diseases of the Mind. By Benjamin Rush, M. D. Professor of the Institutes and Practice of Medicine, and of Clinical Practice, in the University of Pennsylvania. 1 vol. 8vo. Kimber and Richardson, Philadelphia.

Elements of Chemical Philosophy. By Sir Humphrey Davy, L.L. D. Sec. R. S. Prof. Chem. R. I. & B. A. M. R. I. F. R. S. E. M. R. I. A. Member of the Royal Academy of Stockholm; of the Imp. Med. & Chir. Academy of St. Petersburg; of the American Philosophical Society; and Honorary Member of the Societies of Dublin, Manchester, the Physical Society, and the Medical Society of London. Part 1. vol. 1. Bradford & Inskeep, Philadelphia.

The Philosophy of Experimental Chemistry. By James Cutbush, Professor of Chemistry, Mineralogy, and Natural Philosophy in St. John's College, Annapolis, President of the Columbian Chemical Society, &c. &c. 2 vols. 12mo. Isaac Peirce, Philadelphia.

Engravings of the Arteries; illustrating the Anatomy of the Human Body, and serving as an introduction to the Surgery of the Arteries. Consisting of twelve handsomely coloured Plates, and eighty pages letter-press Explanations. By Charles Bell. royal 8vo. Anthony Finley, Philadelphia.

The Theory of Agreeable Sensations; in which the Laws observed by Nature in the distribution of Pleasure are investigated, and the principles of Natural Theology and Moral Philosophy established. Anthony Finley, Philadelphia.

A System of Operative Surgery, founded on the Basis of Anatomy. By Charles Bell. 2 vols. royal 8vo. Hale & Hosmer, Hartford, Conn.

PROPOSED AMERICAN PUBLICATIONS.

Thomas Dobson, has in press, Cavallo's *Elements of Natural Philosophy*; condensed and improved by the Rev. F. X. Brosius.

Kimber & Richardson, propose to publish, *A Treatise on the Diseases of the Eye.* By J. Saunders.

Isaac Pierce, has in press, *Memoirs of the Columbian Chemical Society.* vol. first.

Kimber & Conrad, and Edward Parker, intend putting to press the ensuing spring, *Elements of Surgery, for the Use of Students: with Engravings.* By John Syng Dorsey, M. D. Adjunct Professor of Surgery in the University of Pennsylvania, and one of the Surgeons to the Pennsylvania Hospital.

THE
ECLECTIC REPERTORY
AND
ANALYTICAL REVIEW.

VOL. III.

APRIL, 1813.

No. III.

SELECTED PAPERS.

A Case of Lithotomy, with Remarks on the Effect of that Operation, and on some Cases of Fistulæ in Perinæo. By THOMAS CHEVALIER, Esq. F. L. S. Surgeon Extraordinary to the Prince Regent; and Surgeon to the Westminster General Dispensary.

[From the Medico-Chirurgical Transactions, Vol. II.]

I AM induced to lay an account of the following case before the Society, not more from the particular circumstances which the history of it is intended to record, than from the confirmation it affords of the late Dr. Austin's theory, respecting the formation and growth of stones in the urinary bladder.

Nathaniel Martin, aged fifty-nine, a stout and rather corpulent man, consulted me at the end of November, 1807, on account of extreme pain in passing his urine, with frequent provocation to void it, attended with the discharge of large quantities of mucus from the bladder. He informed me that he had several years before been attacked with dysury, and inflammation in the perinæum, which had been followed by an abscess. The abscess healed, but the symptoms of irritation in the bladder remained, and had continued to increase.

I introduced a sound, and feeling a stone very distinctly,

I did not hesitate to propose the operation, as there were no circumstances existing which appeared to me to render it unadvisable.

I performed it on the 9th of December, and extracted two stones of moderate size. He slept better that night than he had done for many months, and every thing appeared to go on favourably till the end of the second week, when I of course expected the urine would begin to pass through the urethra. The wound had constantly looked well, and was gradually closing. He was at this time attacked with a violent diarrhœa, and in a few days began to complain of pains resembling those he had experienced before the operation, and they soon became equally severe. The urine did not now continue to flow away constantly, but when a small quantity was collected in the bladder, he felt a desire to pass it, and after a severe pang, which extended along the urethra, it was discharged through the wound; and when it could be collected in a vessel, the same mucus, though much less in quantity, was found at the bottom as formerly. I had been very particular in my examination of the bladder after the operation, and had injected two large syringe-fulls of water to clear it perfectly, and therefore I was convinced no particle of stone had been left there. But as he complained of some pains in his back as well as in his bladder, I at first thought it not improbable that some small calculus had descended from one of the kidneys, and had blocked up the wound. I therefore introduced a long probe curved, through the wound, and examined it and the bladder with the utmost care. At the superior part of the incision, the probe seemed to touch particles of a gritty matter, but nothing whatever could be discovered within the bladder itself. These embarrassing circumstances were however soon explained; for in two or three days there began to be discharged through the wound, a soft kind of paste, made up of a white sabulous substance, and mucus, of which a considerable quantity was, from time to time, collected upon the dressings. He then complained of much pain in the penis, and on examining this, the urethra was found completely choked up with the same substance, but harder, of which some was taken out from time to time by a convenient instrument, as it appeared to be forced forward by every effort

to make water. At length, after several weeks spent in this manner, it ceased to be discharged, the urine then came freely through the urethra, the wound in the perinæum completely healed, all symptoms of irritation went off, and he has had no return of them to the time I am now writing this paper. (January, 1811.)

Prior to the discharge of this sandy substance, I endeavoured to relieve his pain by opiates chiefly; but when that appeared, and the diarrhœa had subsided, I ordered him the muriatic acid, with tincture of opium, first in water, and afterwards in an infusion of the uva ursi. He continued the use of the acid to the end of January. How far it might contribute to his relief I cannot say, but he thought it gave him ease, and it seemed to have a beneficial effect upon his general health.

It will be recollected to have been the opinion of Dr. Austin, deduced from a variety of experiments, that the matter composing calculi, is a deposit, furnished chiefly from the mucus secreted by the internal coat of those organs through which the urine passes; and that, therefore, this fluid contributes much less to their formation and growth in the bladder, than had been generally supposed. The quantity of mucus, which is frequently discharged with the urine of calculous patients, is, therefore, to be considered both as a cause, and an effect, of increase in the size of a stone. The stone, by its asperity, irritating the internal coat of the bladder, and exciting an excessive secretion of mucus; the mucus, on the other hand, affording an increased supply of calculous matter to crystallize upon the stone, and augment its bulk.

It is therefore probable, that a considerable quantity of calculous or sabulous matter may sometimes be supplied in a short time, when from any cause, after the extraction of a calculus, as well as under any other circumstances, the bladder is thrown into a state of irritation.

In the case I have related, this appears most evidently to have been the case. The secretion of mucus, to which the bladder had been accustomed, ceased soon after the operation; but was again renewed, in consequence of the irritation produced upon the wounded bladder by an almost incessant diarrhœa. At first it was carried off with the urine as fast as it was

secreted, and therefore no time was allowed for the sandy matter to crystallize from it; but when the wound became so nearly closed, that the bladder began to retain the urine, and of course the mucus, it was separated in considerable quantity, but was still carried off, with the mucus, in this paste-like substance, partly through the wound, and partly through the urethra. At length the secretion of this depraved mucus ceased, and all the symptoms accompanying it consequently disappeared. But, had it continued much longer, there can be little doubt that a new calculus would have formed, and a repetition of the operation would have become necessary.

It is a curious fact, which, before Dr. Austin's publication, was never explained, that a great majority of those persons who have undergone the operation of lithotomy, and have recovered, have remained free from the disease during the remainder of their lives. Some change must, therefore, have been produced in the organs secreting the fluid, whatever it be, from which the materials composing calculi are supplied. That such a change should be induced on the kidneys, seems much less probable than that it should take place in the bladder itself, on which the operation is immediately performed.

The *kidneys* continue their office after the operation, as well as before; and their experiencing little or no interruption in so doing, is considered as a favourable omen with regard to the event. It is evident, however, that the functions of the *bladder* entirely *cease* for a time; and that it enjoys, if I may so express myself, a state of absolute rest from its duties, during the whole interval which elapses between the period of the operation, and that in which the union of the wound is so far completed, as to allow the urine to accumulate in it. It then resumes its offices, both as a reservoir, and an evacuator of that fluid; but it resumes them only gradually, for the quantity it retains is at first but small, and of this a part is usually for some days discharged through the wound, and a part only through the urethra; at first with short, and afterward with longer intervals between each evacuation.

To this state of rest, and suspension of every former source of irritation, more than to any other of the causes hinted at by Dr. Austin, I am disposed to ascribe that favourable change

in the secreting surface of the internal coat of the bladder; in consequence of which, supplying afterward only healthy mucus, and this but in due proportion, the future formation of calculi, so far, at least, as it arises from superabundance, or depraved mucus, will, of course, be prevented.

That some cases should occur in which the bladder retains a considerable degree of the irritability it had acquired before the operation, so that the secretion of this mucus should continue, and calculous matter be again deposited; and that, in other cases, this irritability should be revived by the descent of new stony concretions from the kidney, which speedily become too large to be transmitted along the urethra, and thus reproduce the disease, cannot appear wonderful. It is rather surprising, that the proportion of such cases is not much greater than we really find it. It may also appear justly surprising, that the irritability of the bladder should not, in some cases, be *augmented* by the wound it receives in the operation. This is extremely rare in those cases where the patient recovers: when, as is sometimes unfortunately the case, the bladder, instead of feeling more relieved by the removal of the stone, than injured by the wound made in the operation, takes on a high degree of increased irritation: this usually commences almost from the moment of the operation, and the case is likely to terminate fatally. But if the alarming symptoms subside, and the patient afterward recovers, the bladder returns to as tranquil a state as if they had not occurred; which they are most apt to do when the patient, at the time of the operation, is in other respects in a state of high health and vigour, and the constitution has been but little affected by the disease.

The state of the bladder, however, which these symptoms denote, is not a state of mere inflammation of that organ, and is also to be distinguished from an attack of peritonitis. It appears much to depend on the shock given to the nervous system in the operation, and communicated to every part of the body; but of which the bladder, from its wounded, and previously morbid state, partakes more than any other. On the dissection of such cases, the local inflammation has sometimes been found to be slight; but it is well known, that the influence of any important, and, sometimes, even of a comparatively un-

important accident, or operation, is such, as frequently to derange the whole nervous system in a similar manner, and, for a time, to disturb every function, and deprave every secretion, in the animal economy.

That, however, an attack of common inflammation of the bladder may sometimes prove ultimately beneficial, by destroying a state of previous morbid action, the following case renders highly probable.

George Hunter, a boy about ten years of age, had frequent obstructions to the passage of his urine, by small cysts, or rather concave films, of an opaque membranous appearance, which were afterwards voided. As his fits of pain were sometimes severe, it was thought highly probable there might be a stone in the bladder; and, under this impression, he had been repeatedly sounded by my judicious friend, the late Mr. Ford, but without any calculus having been discovered. When I succeeded that gentleman, as Surgeon to the Westminster General Dispensary, where the boy had been received as a patient, he came of course under my care. Shortly afterwards he was attacked with a severe fit of dysury, which was followed by violent inflammation of the bladder. It was necessary to draw off his urine from time to time, which contained a considerable quantity of purulent matter. On one occasion, when I had introduced an elastic gum catheter, I felt distinctly what appeared to me to be a stone: it was also felt by one of my pupils, who was with me, and also by the boy's father, who, on hearing me say I had found a stone, wished to satisfy himself of the fact, and was much pleased that the cause of his child's sufferings appeared at last to be detected, and a prospect afforded of their being terminated at a fit time by an operation. I was never after, however, able to distinguish it again, either with the flexible catheter, or a metallic instrument. But, when he was recovering from the attack above mentioned, he one day voided a piece of coagulable lymph, of the same form as the films which had used to come away, but of much more solidity, and containing calculous matter on both its surfaces, which was easily rubbed off. After this he felt much relieved. He once or twice brought away some small films resembling the former, but he had no return of the symptoms which before

distressed him. After some time he went to Antigua, where he now is. I have heard of him twice since his residence there; and, in his letters, he has stated himself to remain perfectly free from his complaint.

In this instance it appears most probable, that the little cysts or films, which he had been used to void, were portions of coagulable lymph, thrown out and detached, from time to time, from some small part of the bladder, or of the pelvis of the kidney, in contact with which some calculous matter had been deposited. When violent increase of action, by inflammation, took place, the calculous matter was dislodged, and the cause of the disease removed. However, as it did not return, a salutary change must also have been produced on the part primarily affected.

But in the most favourable cases of lithotomy, no particular inflammation of the internal coat of the bladder appears to follow the operation. The change which takes place in it must, therefore, depend on some other cause; and seems chiefly owing to the quiescent state in which the bladder remains for many days after the operation, and by which it is enabled to recover an healthy condition. In this it will probably continue, if no fresh cause of irritation be applied to it. I am the more disposed to believe I have not ascribed too much to this circumstance, from the benefits so often derived in other parts, which have been long in a state of morbid action, when their functions can be a while suspended, and from the facility that suspension affords to the successful prosecution of the treatment of their diseases.

In many diseases of the extremities, the necessity of this repose is obvious, and, fortunately, so is often the possibility of attaining it. But what shall we say to diseases of the stomach, of the urethra, and of other parts, to the functions of which it does not at first seem probable that any material suspension can be admitted.

Yet in several very obstinate cases of fistulæ in perinæo, particularly in one which had arisen from a violent contusion, and was accompanied with great induration in the perinæum and scrotum, from repeated inflammations and abscesses which had formed, and where, from the consequent obliquity and irregu-

larity of the canal of the urethra, added to its extreme irritability, little or no progress was made by the bougie, I was led to recur to the principle I have mentioned, and to consider whether some advantage might not be gained, if the treatment were *commenced*, by making such an opening into the urethra, behind the seat of the obstruction, as would allow the whole of the urine to pass through, without getting to the diseased portion of the canal, and insinuating itself into the sinuses that communicated with it. By thus keeping the parts without their accustomed stimulus, and allowing them to remain in a state of comparative rest for some days, I hoped so to diminish their irritability, swelling, and hardness, as to attain greater facility in carrying on the requisite treatment by the bougie and catheter. I was the more strongly inclined to expect success from this measure, from having observed the beneficial change which had almost immediately taken place in the state of the urethra, in two cases where I had found it necessary to puncture the bladder through the rectum. The result of such an opening into the urethra, as a preliminary step in the treatment, fully equalled my expectations. The parts having their chief source of irritation for a time withdrawn, in a few days became more yielding; the sinuses which were produced were consequently more easily traced through all their irregularities; way was more readily made for the passage of an instrument; and sufficient access to the bladder was soon obtained for the passage of a full sized catheter. The old sinuses were then readily traced and laid open, so as to make them granulate from the bottom and heal.

It has not been unusual to make such an opening into the urethra, when, in consequence of its being torn, or ulcerated, either from external violence, or in cases of stricture, the urine has escaped into the cellular membrane; in which instance it becomes immediately necessary to prevent, or stop, the mortification, which arises from the diffusion of this pernicious fluid. But the propriety of it, in those cases to which I have before alluded, has not been, I think, sufficiently considered; at least, I do not know that it has been proposed by any writer on these diseases. But the arguments in its favour, and the success I have experienced from it, make it appear to me deserving the attention of surgeons.

It must, however, be observed, that the indurated and thickened state of the perinæum, and the contraction of the urethra, render it often rather a difficult matter to find the canal; and therefore a free division of the integuments, in the first instance, will be prudent. And, indeed, by a free incision through the hardened integuments, considerable advantage may be gained. For, in some cases, the urethra itself is not primarily diseased to any great extent, but its canal is made irregular, and its internal surface crumpled, as it were, in consequence of the mischief around it, so that, in several instances, where I have removed the penis and bladder after death, although the smallest instrument could not be passed without great difficulty before, yet, when they were detached, a large catheter has readily gone on into the bladder.

As a remarkable example of this fact, I may mention a servant of the late Mr. Watken, who had laboured under fistulæ in perinæo for twenty years, during which time, he informed me, a bougie had been once only passed into the bladder, and that was by the late Mr. Hunter. On the last occasion in which I was sent for to visit him, he not only suffered from disease of the perinæum and bladder, but was evidently consumptive, and fast approaching to dissolution. I made various attempts to introduce an instrument into the bladder, and succeeded once in passing a very small bougie. No particular relief followed: indeed, the parts seemed rather irritated than benefited by it. On his death, I fully expected to find the urethra almost closed up for some considerable extent; but when I had taken away the penis and bladder, and the urethra was thus disengaged from the hardened cellular membrane and skin, a sound readily passed on to the bladder; and, on laying open the canal, I found no regular stricture had been formed, but that it was a little bent aside at that part; and for near two inches, from the commencement of the bulb to the prostate gland, its surface had the appearance of being crumpled or puckered into folds; which, with the indurated state of all the surrounding parts, accounted both for the difficulty of passing a bougie, and also for his being able to get the urine away with more ease than could have been expected, under so much apparent obstruction.

I have, therefore, no doubt that such a state of the urethra,

accompanying fistulæ in perinæo, is more common than is generally supposed, especially where the disease has originated from external violence, and that it is often confounded with common Stricture. In such cases a free division of the diseased integuments down to the urethra, in performing the operation I have recommended, must tend materially to relieve that portion of it, by setting it in some degree at liberty; and by this, connected with the opening into the canal behind the diseased part, which will prevent the urine from forcing itself into the sinuses, a material advantage will be early gained, and a great hindrance to the treatment removed. The constitution, also, will sooner feel relief, in consequence of that which is afforded to the diseased parts; those medicines, which may be required to restore the general health of the patient, may therefore be exhibited with less interruption; and the cure will thus be more speedy, and probably more complete.

A Memoir upon the Organs of Absorption in Mammiferous Animals; read at the Institute, on the 7th of August, 1809, by M. MAGENDIE, Doctor of Medicine of the Faculty of Paris, Professor of Physiology, &c. The Experiments conducted by Doctors MAGENDIE and DELILE.

[From the New London Medical and Physical Journal, for August 1812.]

AMONG the facts which I had the honour to report to the Class, in a memoir upon the upas tieuté, the nux vomica, and the bean of St. Ignatius, there is one which appeared to me worthy of more particular attention; I mean the readiness with which those poisonous matters are absorbed and introduced into the sanguiferous system. It must be recollected, that it scarcely requires twenty seconds to convey these poisons from the peritoneal cavity to the spinal marrow.

The generally received ideas relative to the organs of absorption, do not admit of a doubt that the lymphatic vessels are the agents for conveying these poisons into the sanguiferous system. Thus, in the experiment where the poison was introduced into the middle of the thigh of an animal, there was but one way of

explaining its absorption; it must necessarily be admitted that it was taken from the wound by the lymphatic vessels of the parts with which it was in contact; that after being absorbed, it was carried by these vessels towards the glands of the groin; that after traversing these bodies, it was conveyed, still by the lymphatic vessels, to the thoracic duct; finally, that it was introduced into the sanguiferous system by the communications which the thoracic duct preserves with the subclavian veins, and principally with those of the left side.

Such ought to have been, and such, in fact, was our opinion, at the time of the publication of the memoir upon the strychnos. Nor were the experiments, of which I am about to give an account, undertaken with a view to discover new facts, but rather to add a degree of certainty to an explanation already admitted; and our labours did not take a particular direction, until a greater number of facts obliged us to modify our view of this subject. But so rapid an absorption by vessels, whose principal characteristics are weakness and slowness of action; a poisonous substance that so quickly pervades the difficult and winding route of the lymphatic glands, without any alteration therein, were two circumstances that ought, perhaps, to have made us entertain some doubts of the correctness of the received explanation. This explanation, however, is given by so many respectable persons, and is supported by experiments so positive, that even now, when we have many facts to oppose it, we dare not say that it wants exactness, but only, that it is not admissible under every circumstance.

Previous to any detail of our experiments, it will not be useless to relate, in a few words, an opinion which for some time balanced the present prevailing belief relative to the organs of absorption.

This opinion, professed by Boerhaave, Haller, Méckel, Ruysch, Swammerdam, and others, was, that the sanguiferous veins, in common with the lymphatic vessels, possessed an absorbing power.

It is supported by different circumstances of structure, and by some physiological and pathological facts. A series of interesting experiments, undertaken and executed a few years since, at the veterinary school of Alfort, has also strengthened the

probability of such absorbent property of the veins, but without producing entire conviction. It is well understood, that an opinion established upon the physical structure of the organs, deduced from a sufficient and conclusive number of experiments, and supported by the names of Boerhaave, Haller, and Ruysch, ought not to be easily abandoned. Nor was less required than the anatomical discoveries of the last century, the correct experiments of Hunter and his brother, those of Cruikshank, Mascagni, Desgenettes, and others, to establish the belief that the lymphatic vessels only possess the absorbent faculty.

I will further cite, in support of the general opinion, some very curious experiments lately made by M. Dupuytren. This physiologist, who has kindly permitted me to report the principal results of his labours, tied the thoracic duct in several horses; some of them died in five or six days, others preserved every appearance of health. We know already, by an experiment of Duverney, by some observations on the thoracic duct when obstructed, and above all, by the experiments of Landrin, that the thoracic duct may cease to convey the chyle into the subclavian vein, without being followed by the death of the animal; it is true, we also know, that some animals died in consequence of a ligature round the duct; but we are entirely ignorant of the cause of this diversity in the results. M. Dupuytren, by his experiments, has found one very satisfactory. In the animals that died in five or six days, from the ligature round the thoracic duct, he always found it impossible to pass any injection from the inferior part of the duct into the subclavian vein; consequently, it is very probable, that the chyle ceased to be conveyed into the venous system immediately after the application of the ligature. On the contrary, in all the animals who had survived the application of the ligature, it has always been easy to make every kind of liquid pass from the inferior part of the duct to the subclavian veins, by means of the very numerous communications between these two points by the lymphatic vessels, placed alike in the posterior as in the anterior mediastinum.

I have personally assisted M. Dupuytren in opening a horse, the thoracic duct of which he had tied more than six weeks before, and I easily satisfied myself that there existed evident

communications between the inferior portion of the duct and the subclavian veins, although this canal was entirely destroyed at the place of the ligature.

I now proceed to the experiments, which I made, for the most part, in concert with M. Delile, to determine, whether the lymphatic vessels are really the only ones by which foreign substances enter into the venous system.

A circumstance that has always thrown some obscurity over the experiments upon absorption, is, the difficulty of demonstrating, with certainty, the passage and presence of absorbed matters, either in the lymphatic or sanguiferous vessels. We have not these inconveniences to fear in employing the *upas*, or the *nux vomica*; for it is known, that two centigrammes of these substances produce effects too remarkable to be mistaken.

Would the ligature round the thoracic duct stop the passage of the poison in the sanguiferous system, and consequently, its effects upon the spinal marrow? This was the first question that we proposed to resolve.

I have applied in a dog a ligature to the thoracic duct, a little before its opening into the left subclavian vein; I afterwards introduced a solution of the *upas* into the cavity of the peritoneum. The effects of the poison were as prompt and marked as if the thoracic canal had not been tied. I have tried the same ligature in other animals; but instead of introducing the poison into the cavity of the peritoneum, I introduced it either into the pleura, or into the stomach, the intestines, or muscles of the thighs, &c. The effects have always been equally rapid and intense, as if the thoracic canal had been free.

Decisive conclusions cannot be drawn from these first essays, for we know, that the thoracic canal is not the only point of communication between the lymphatic and venous systems. There is ordinarily, on the right side, a second thoracic duct, almost as considerable as that on the left; the large lymphatic vessels often open themselves solitarily into the subclavian veins; and more frequently still the thoracic duct has several mouths into the veins where it terminates.

One of these circumstances was found to occur in the animals subjected to our experiments; and we must have recourse to other trials, from which other results, less equivocal, may be deduced.

Upon a dog who had eaten a large quantity of meat seven hours before, in order that his abdominal lymphatic vessels might be easily perceived, we made an incision through the parietes of the abdomen, and took from thence a coil of the small intestines, upon which we applied two ligatures about five inches apart from each other. The lymphatics, which had their origin in this turn of the intestine, were very white and very apparent from the chyle which they contained. Two ligatures were placed at the distance of one centimetre upon each of these lymphatics; we cut these vessels between the two ligatures; we took great care in our experiment, and assured ourselves, by every possible means, that the curvature of the intestine, taken from the abdomen, had no further communication with the body by the lymphatic vessels. Five arteries and five mesenteric veins ended in the portion of the intestine comprised between the two ligatures; four of these arteries and four of the veins were tied and cut in the same manner as the lymphatics; the two extremities of the curvature of the intestine were cut and entirely separated from the rest of the small intestine. Thus we had a portion of the intestine about five inches in length, not communicating with the rest of the body, but by one artery and one mesenteric vein; these two vessels were separated at the distance of four fingers breadth. We even raised the cellular substance, lest some lymphatic vessels might lie there concealed. We had nothing further, by which to obtain a positive result, than to inject a small quantity of the *upas tieuté* into the cavity of the intestinal curvature. This was also done with proper precautions to prevent the escape of the injected liquor. The curvature of the intestine, enveloped in fine linen, was replaced in the abdomen; it was then precisely one o'clock. To our great astonishment, about six minutes after, the general effects of the poison diffused themselves with their usual intensity, and in such a manner, that every thing proceeded as if the curvature of the intestine had been in its natural state.

The animal being dead, we examined the parts; no ligature was displaced, nothing could make us suppose that the poison had passed into the abdominal cavity.

This experiment, repeated several times, without any modification in the result, appeared to us most conclusive; it proves,

at least, as far as can be proved in physiology, that the lacteal vessels are not the exclusive organs of intestinal absorption.

This kind of absorption, different from that of the lymphatic, may be peculiar to the intestines; it would be important to know, if it could be discovered to exist in the other parts.

We separated from its body, the thigh of a dog, previously rendered comatose by opium, (in order to spare it the pain of a difficult experiment;) this separation was so made, that the thigh still communicated with the trunk by the *crural* artery and vein. We took, with regard to these two vessels, the same precautions as for the mesenteric vein and artery in the preceding experiments; that is, we isolated them on an extent of four centimetres, and raised their cellular *coat*, lest it should conceal some lymphatic vessels; we then inserted two grains of the poison in the foot, and waited the effects. They manifested themselves with as much promptitude and energy, as if the thigh had not been separated from the body; insomuch, that the first signs of the action of the upas appeared before the fourth minute, and the animal died before the tenth.

It may be objected, that notwithstanding all the precautions taken, the arterial and venous parietes still contained some lymphatics, and that these vessels were sufficient to give passage to the poison. It were easy to refute this objection.

I repeated, upon another dog, the preceding experiments, with this modification, that I introduced in the crural artery a small quill, upon which I fixed this vessel by two ligatures; the artery was afterwards cut circularly between these two bands. I did the same to the crural vein; so that there was no longer any communication between the thigh and the rest of the body, unless by the arterial blood which comes to the thigh, and by the venous blood which returns to the trunk. The poison introduced into the foot produced its general effects in the ordinary time, that is, in about four minutes. It may be deduced, I believe, from these different experiments, that the lymphatic system is not, at least in certain cases, the exclusive route that foreign substances take to arrive at the venous system.

This new mode of absorption, much more direct than that by the lymphatics, presents the means of easily conceiving the

rapidity with which the different deleterious and other matters are absorbed, as well as the rapidity with which they produce their effects upon the system.

But what are the organs that first absorb the poison from the parts where it has been introduced? Are they the radicles of the veins, or are they rather the capillary lymphatics, which, having immediate anastomosis with the sanguiferous capillaries or exhalants, would immediately diffuse the poison through the venous system?

The experiments which I have just related, joined to those which have been made on the same subject, appear to me totally insufficient to decide either of these questions; only, it ought to be remarked, that our experiments are strongly in favour of a direct absorption by the veins.

But it is a fact, rendered evident by the preceding experiments, and upon which it is necessary to pause a moment, that the venous blood becomes charged with the poison; and that, by the intervention or means of this blood, the poison produces its deleterious action upon the system. In fact, if in the experiments where I had separated the thigh from the trunk, we suspend the course of the venous blood, by compressing between two fingers the crural vein, we lessen, and even totally suspend, the production of the effects. The blood of an animal, in which the signs of action of the *upas* is developed, contains then, some portion of poisonous matter; indeed, it may be said to be really poisoned. It were curious and interesting to know, if this blood, carried into the circulatory system of a healthy animal, would produce effects similar to those it had upon the animal itself. At first sight, we are led to believe that this is extremely probable, even that it is certain. The following experiments will shew with what care we ought, in physiology, to distinguish that which is probable from that which is proved by experiment.

We passed the arterial blood of an animal, in which the tetanus caused by the *upas* was manifest, into the jugular vein of a healthy animal; the transfusion lasted near twenty minutes, so that the healthy animal received a very considerable quantity of poisoned blood, which at the first moment of the experiment, was of a red and vermilion colour, and which after-

wards became violet and black, when the upas had produced asphyxia. There did not, however, appear any irritation of the spinal marrow, and the animal only experienced what happens in common transfusions, made with care. I mean, that it had, for some hours, a very marked acceleration of the inspiratory and expiratory motions as well as a very abundant pulmonary exhalation. Frequently repeated, this experiment has always produced the same results.

We were now certain, that the arterial blood of animals, poisoned by the *upas tieuté*, the *nux vomica*, or the *bean of St. Ignatius*, was not susceptible of producing similar effects on other animals; it would not be, perhaps, the same with the venous blood. It may be presumed, that the respiratory action changed the nature of the poisonous substance; and this alteration might, to a certain degree, give the reason, why the transfusion of the arterial blood of animals poisoned by the strychnos, is not followed with bad effects.

This circumstance did not take place with the venous blood, which returns from the part where the poison has been introduced. After the experiments reported in the memoir upon the upas, and in this, it is impossible to doubt, that this blood does not transport the poison to the lungs. It is very probable, that introduced into the circulatory system of another animal, it would produce effects similar to those which it caused upon the animal on which the inoculation of the poison was made.

A small piece of wood covered with two grains of *upas tieuté*, was struck into the thick part of the left side of the nose of a dog. Three minutes after this introduction, we passed into the venous system of another dog, the blood of the jugular vein of the side where the introduction of the poison had been made. The transfusion commenced about one minute before the first signs of the upas; it did not cease until the death of the animal who experienced it. No appearance of irritation of the spinal marrow was perceived in the animal who received so great a quantity of poisoned blood.

Although these experiments were repeated several times, with variations in the mode of introducing the poison, we never could perceive in the healthy animal, who had suffered the

transfusions of poisoned blood, any thing which resembled the effects of the strychnos.

Results so positive, appear to us of a nature to warrant the conclusion, that the venous blood of animals poisoned by the *upas*, the *nux vomica*, and the *bean* of *St. Ignatius*, is no more capable than the arterial blood, of producing upon another animal the effects which it will cause upon the animal from which it was taken.

If there still remained any doubts, they would be removed by the following experiment, which was repeated several times.

As in the experiments above related, we separated, from the body, the thigh of an animal, isolating as before the crural artery and vein; we introduced the poison into the separated foot, and transfused the blood of the crural vein into the jugular vein of a sound animal. The passage of the blood from one animal to the other, lasted more than ten minutes, a time more than sufficient for the production of the effects of the *upas*. But no sign of the action of this poison was perceived, either in the one or in the other animal. The one preserved perfect health, the other died in a few days, in consequence of the amputation of the thigh, and the loss of blood which was transfused.

It must not, however, be thought, that in this experiment the transfused blood, by some particular cause, had no deleterious properties, for the following experiment proves the contrary.

As in the preceding experiment, I separated the thigh from the body; three minutes after introducing the poison into the foot, I passed the blood of the crural vein into the jugular vein of another animal; the transfusion was prolonged five minutes without producing any effects. I then stopped it, and disposed things in such a manner that the blood of the crural vein should return to the animal to which it belonged. Almost instantly this animal exhibited evident signs of the action of strychnos on the spinal marrow.

From the different experiments reported in this memoir, we must, I think, conclude,

1st. That the lymphatic vessels are not always the route followed by foreign matters, to arrive at the sanguiferous system.

2. That the blood of animals, upon which the bitter strychnos has produced its deleterious effect, cannot produce any fatal effects upon other animals.

As to the explanation of this singular phenomenon, it would be, I think, premature to give it at present. In physiological science, we ought to be sparing of conjectures, and prodigal of facts.

MAGENDIE, D. M. P.

Note.—This Memoir has received the approbation of the Institute.

On Painful Affections of the Side from Tumid Spleen.

By ROBERT BREE, M. D. F. R. S.

[From the Medico-Chirurgical Transactions, Vol. II. No. I.]

AMONGST the painful affections of the side that may be attributed to internal causes, the disorders of the spleen are distinguished with difficulty in their early stage.

The histories of morbid spleen which have been given by anatomists, do not furnish a satisfactory account of the early signs of the disease. The symptoms which recently preceded death, are often minutely detailed; but as these are necessarily connected with the states of other viscera which had suffered inflammation, the case is deprived of its distinct character, and the description shews the result of complicated disorders, but explains little of their progress, and still less of the beginning of a simple and limited complaint.

On the state of the spleen itself, they report certain appearances which must have proceeded from disease, and not from original defect of structure.

The spleen has been wasted to the smallest size. The capsule only containing a little of its reticular or vascular substance, and possessing its peritoneal covering.

A second state is the excessive enlargement of the spleen. The natural weight of this organ may vary from 9 ounces to 14 ounces; but after chronic diseases of the viscera, and intermit-

tent fevers, it has weighed from one pound to 20, and even 30 pounds.

A third state is that of its structure being destroyed, and its substance corrupted or broken down into a sanious mass, which has often distended, and sometimes ruptured the coats. This condition has been the sequel of long protracted disease, or the effect of fevers of a rapid and particular character.

Fourthly, a great portion of the substance of the spleen has been found in a cartilaginous state, and occasionally its peritoneal coat ossified.

Systems of medicine do not afford us more satisfaction by their descriptions of Splenitis: Cullen says (ccccxxv) that it may be readily known by his definition in the Nosology: he refers also to his doctrine on the inflammation of the other abdominal viscera for the practice which it requires, as well as for information respecting its three modes of termination, by "resolution, suppuration, or gangrene."

His account of Splenitis agrees with that of writers in general, but it corresponds so little with the facts which actually appear in the early stages of the disease, and the practice is so insufficient or inapplicable at this period, that it is surprising the defect should hitherto have escaped observation.

Splenitis, or more properly speaking, "the tumid and painful spleen," is not at its commencement a febrile disease; and yet this affection is so sensibly felt, that the character by which *chronic* Hepatitis is distinguished from *acute*, cannot be applied to it. Whilst inflammatory or febrile action is absent, the disease cannot terminate by "suppuration or gangrene." Nor can it, for the same reason, end by "resolution," if this term be taken in its ordinary meaning.

It will appear that the turgid condition of this viscus may continue for many months, during which time the pain may be acute, and the swelling may be perceptible under the spurious ribs, and no fever may attend the complaint.

An increase of pulse takes place, as recovery from the actual disease proceeds, so that it not only might exist without fever, but a moderate degree of fever may be an indication of the return of health to the organ.

It must be unnecessary to speak here of the structure of the

spleen, after the account which has been given of this viscus by CUVIER, and confirmed by the recent investigation of Mr. HOME.

The parenchyma of this viscus, however little it may be disposed to inflammation, is susceptible of injury from the distension of its numerous vessels, which may be so great as to overcome their power of contraction, at the same time that the ligamentous fibres may be weakened in an equal degree, or wholly lose their elasticity. Inflammation may be expected to supervene on this condition at some period; but I believe this never takes place, but on the accession of injury to the peritoneal coat, either from the internal distension having been of long standing, or from external violence.

Having had favorable opportunities of considering abdominal diseases complicated with asthmatic affections, I have been led to pursue a treatment which I have thought more appropriate to the nature of splenic disorders, than what I had been directed to by books, or had observed in general practice.

I had noticed, in a protracted case of dyspnœa, with pain of the left side, the manifest relief that was obtained from a free discharge of hæmorrhoids, and I endeavoured to imitate this process of nature. The patient was a young man of 22 years of age. He had suffered attacks of tertian fever two years before, and had been in feeble health, with constant uneasiness of the left side, during the last year. The ague had left him when he changed his residence a year and an half preceding my attendance; but the pain of his side had resisted all the means that had been applied for his relief. At length the piles bled considerably for the first time, and he was restored to his former ease for three months. On the approach of winter, the disease returned and gradually became as oppressive as before. He was unable to rest on his right side. There was no external sign of enlargement on the left side; but he had a sense of weight and fulness, with severe pain under the short ribs, extending to the lowest rib on that side. There was no fever, and the state of the belly and urine was natural. I proceeded to treat the case with aloetic aperients united with assafetida and sulphate of potash. In a few weeks the piles returned and carried off the complaint. As I had considered this pain of the

side as an affection of the spleen, I placed the result of the case amongst the facts that influenced my opinion on similar disorders, which afterwards came under my care. Many of these were cases of female patients, in whom dyspnœa and pain in the region of the spleen, were wholly removed or greatly relieved by the flow of the menses.

I was directed by this experience, casually acquired, to the practice which I have since pursued in diseases of the spleen.

I beg to submit to the consideration of the society the following case, as explanatory of the remote cause of turgid and painful spleen, and of the manner of treating this affection with success.

CASE.

M. A. October 26, 1809.

This young lady is 17 years old, of a fair complexion, and of much vivacity and intelligence of mind. She has pain of the left side, which began a month ago, and has gradually increased to the present time. She is unable to lie on the right side, as this posture aggravates the pain of her left side. She has no expectoration, but occasionally a very trifling short cough.—Pulse is 62, and soft. Upon examining the side, no difference is perceived by the eye or hand, but she feels pain under the short ribs upon pressure, and the pain descends lower than the ribs. She is also sensible of bulk and weight under these ribs, which extend from the margin of the eighth rib to the lowest rib, and backwards to the spine. She was at school when this complaint was first felt in a slight manner. She had a puke and dose of calomel given to her without relief; but there was no particular examination of the part at this time. The pain afterwards became gradually connected with giddiness of the head, and difficulty of breathing, particularly when the body was put in motion. In this state she was brought to her friends in town. Two months before this date, and one month before she complained of local pain, she had been bathing in the sea, with some young friends of her family; and she plunged herself 62 times into the water, in a playful humor and in opposition to the advice of the elder part of the company. Though she does not allow that she received immediate injury from this act, it

had been considered by her friends as injurious, and it was always referred to by them as the cause of her complaint.

The symptoms I have enumerated, appeared to indicate congestion in the spleen; nor could I account for the slowness of the pulse, accompanied as it was with fixed and acute pain in the region of the spleen, and difficulty of breathing, by any other probable cause. I prescribed only saline draughts with opium every six hours, and an aperient every morning, at this visit.

October 31st.—I had seen Miss A. several times. I found little variation in the symptoms. A small quantity of wine had aggravated her complaints of vertigo and local pain. The pulse was never more frequent than 62, and generally at 60. There was no heat of the skin, and no sickness attended her vertigo. The tongue was clean, and the discharges of stool and urine natural. There was no cough. But her nights were very much disturbed by the difficulty of lying easy in any posture, and particularly on her sides, the pain of the left side being insupportable when she turned to her right side. The plan of medicine had not been varied; but she had been bled largely without relief. The blood was not inflamed, but so loose in its texture as to show the operation to have been useless, if not improper. Blisters had been applied with as little advantage. She was now directed to take a pill of calomel and opium every six hours with her saline draught, and the purging draught every morning made more active by tincture of jalap and aloes.

To abate pain, pulv. ipecac. compos. was directed to be taken in sufficient doses at bed time.

She proceeded on this plan for several days, during which time her pulse did not rise higher than 64, and generally was found at 60. The urine was increased in quantity, and the skin was more disposed to perspire. She had two loose stools every day. She yet experienced no ease in any posture in her bed excepting on the back.

Nov. 17.—In the first week of November, Miss A. appeared to have some relief; but none of her complaints were removed; and in addition to them she had experienced palpitation of the heart, which also interrupted her repose. She complained in general of more languor than she had been used to feel before

she was bled. She had had five grains of extract of conium twice a day in her pills for the last week: and she took three days since an active vomit, which occasioned the discharge of a large mass of mucus, so considerable as to surprise the observers. There was no bile thrown off, nor any thing that had a particular taste. No benefit or change of feeling resulted from this operation, excepting that she found herself lighter at the præcordia. The vertigo at this time was so distressing that she could not walk across the room without assistance to prevent her from falling.

I now determined to make trial of a plan, which might strengthen and excite the system. I prescribed 15 grains of myrrh with carbonated ammonia and camphor mixture to be taken every six hours. The former medicines were to be discontinued, excepting such proportions of opium and extract of conium, as might be necessary to abate pain.

Nov. 24.—She perceived some relief of her languor, but no mitigation of the other symptoms. Three grains of sulphate of iron were now prescribed in a draught, with myrrh and camphor, to be taken every six hours; and the bowels were to be kept open by the usual means. She was also advised to try the effect of gentle exercise on horseback.

Dec. 10.—Miss A. had not yet rode on horseback. The tonic plan had been frequently varied. She had taken bitters—decoct. cinchonæ—infus. cascarillæ with rhubarb—extract of hop and sulphate of zinc, besides the forms before reported. The pulse had remained during this course at the average of 60, and had therefore been something less frequent than I had generally observed it to be, during the course of saline aperients with calomel. She now made one trial of horse exercise at a gentle walk, but was obliged to desist in half an hour, from the increase of pain of the side, which gradually became insupportable. After this she considered her complaint worse, which she attributed to the riding; but it was evident that the tonic plan had a full share in producing the aggravation of her complaint. I examined her side, where she assured me she felt much increase of bulk, and I perceived a protrusion of substance from within to the margin of the false ribs. This swelling was so manifest on several examinations, that my attention

was recalled to the treatment which I had applied in other cases of a similar nature, and which had been partly pursued in this with more success than the last which I had directed.

Dec. 15.—I advised her to remain constantly in her chamber, that she might pursue without deviation a course of medicines, by which the secretions were to be much increased, and determined chiefly to the bowels and kidneys, whilst the body was in a state of rest. She was willing to acquiesce in all my directions, and I resolved to act upon this principle for a considerable length of time. A saline draught was ordered to be given every six hours, with one grain of aloes and five grains of extract of conium.

Dec. 26.—Having pursued this plan during ten days without variation, excepting in the degree of the strength of the purgative, the symptoms were reduced to the state which prevailed in the last month. The saline aloetic draughts had produced several motions daily without lowness. The medicines were continued with 15 grains of nitre in each draught.

Jan. 9, 1810.—At the beginning of this month, Miss A. was sensible of considerable relief from her complaint; but she was still unable to lie upon the right side. The urine was copious, and perspiration free every night. She had five or six motions daily without any sense of languor; and this state of the bowels seemed to conduce most materially to her improvement. She was recommended to take two grains of antimonial powder, and two grains of aloes three times a day, with gr. iv. of extract of conium. A saline draught with nitre and camphorated tinct. of opium was to be taken every night at bed time.

Feb. 1.—Upon an examination and pressure of the side at the end of January, she was found to be much less sensible of uneasiness, and there was no appearance of swelling. But she still suffered too much to persist in any attempt at lying on the right side. Her dyspnœa was less, she could move without giddiness, and she was much improved in flesh and colour, notwithstanding her close confinement. The pulse had risen to the average of 75. She was directed to continue the medicines with the addition of four grains of extractum papaveris at bed time.

Feb. 5.—The bowels were more torpid than before she took the extr. papav. which, as it had not produced more rest in the night, was discontinued. A mixture of infusion of senna with neutral salts was directed to be taken every morning, and the aloetic antimonial pills to be continued.

In the middle of February she was so far improved, as to propose to leave her chamber. She had insensibly come to lie on the right side. And her complaints were so little felt, as to be spoken of with indifference. The pulse was 80.

March 1.—Miss A. had been a sufferer with her disease above five months; and she had lived in her chamber nearly three months. The catamenia had been regular, and always relieved her complaints. She now considered herself well, as her nights were good, and she very seldom felt pain in her side, difficulty of breathing, or giddiness, and she could use exercise without inconvenience. She was free from all her complaints in the middle of the month; and at the end of March she performed a long journey without suffering any relapse. At the present time she is perfectly well, and much fatter than she was before her illness.

It would be intruding upon the time of the society, if I were to go into a comparison of this case with others, in which congestion and inflammation of the spleen had been proved by examination after death. Its identity has been confirmed to me by the observation of many cases that had been previously under my care. And I believe that the more advanced stages of splenitis, in which inflammation has affected the membranous coverings and connected viscera, may be often followed up to this simple state of disease, as the root from which such complicated disorder had grown.

This and other instances of similar affections, have suggested to me some inferences, which I now offer with deference to the consideration of the society.

This disease appeared to be the direct effect of a repressed circulation from the application of cold to the surface of the body, and every consideration of the nature of such a cause leads to the conclusion, that congestion had taken place in the spleen.

Whatever degree of pain was suffered, it did not increase

the frequency of the pulse, which remained at a slower rate than was natural in the state of health. I consider this state of the pulse as diagnostic of the turgid state of the spleen, when it is accompanied by the symptoms of great pain, and of inability of lying on the contrary side; in which position, the heavy and enlarged spleen acts as a dead weight, drawing the diaphragm, and distressing the adjoining parts. The absence of fever may be explained by the nature of the structure of this organ. It must have great capacity in its arteries when they are dilated to receive blood, that is impelled into them: and it suffers distension for the safety of the system, pyrexia being prevented by the actual turgescence of all its vessels. It is more than probable that there may be pains of the side from turgescence of the spleen, of so obtuse or mild a nature, as to be supported without much complaint. Relief from these pains may be obtained by determining the blood to the lower belly and pelvis: and they are to be partially removed from women by the increase of the catamenia, and from men by the bleeding of the hæmorrhoidal vessels. When there is much dyspnœa, without fever, attending a heavy uneasiness in the left side, the spleen may be considered as the suffering part, even if there be no external tumor. This conclusion will be stronger, if there be giddiness of the head and distress from lying on the right side. We may presume, that though the internal structure of the spleen is loaded with blood, the capsule and the peritoneal coat are not yet distended, or not in a considerable degree.

From this inferior degree of affection, a more formidable complaint must grow, if it be neglected, or treated erroneously.

The integuments are next distended, and the pain increases in greater proportion than the distension. The diaphragm is spasmodically affected, and the uneasiness is carried under the sternum to the opposite side, while the dyspnœa takes on the character of convulsive asthma. The vertigo, upon motion of the body, increases with all other symptoms. There is no fever even yet, and therefore, notwithstanding such an extent of suffering, there is no inflammation.

I consider this collection of symptoms to make the first stage of splenitis, or turgid and painful spleen.

With respect to the treatment of this disease, the rules for

its removal are few and limited. This will not appear extraordinary, if we attend to its structure and its œconomy, which seem to require a peculiar practice.

The blood must not be driven into it by stimulants during its state of debility: it must then be allowed to rest, that the energy of its vascular and ligamentous substance may have time to recruit. The œconomy of the spleen will, in every respect, make this process slow; but during its passive state, the hæmorrhoidal arteries may be excited to receive an unusual portion of the circulating mass, and to discharge it. The excretories of the kidneys, and the exhalants of the intestines, and the hæmorrhoidal vessels may all produce relief to the spleen when their action is increased. I have not found issues, blisters, or any other external applications produce the slightest advantage.

Bleeding may be supposed to be useful, as it lowers the impulse of the blood to the organ affected, giving its vessels time to exert themselves by rest. Yet this means has not answered well, possibly because it may lower the general tension without promoting that fulness of the vessels going downwards, which is necessary to recovery.

Bleeding by leeches, as well as blisters, must be necessary in the advanced stages, where the peritoneal coat is inflamed, and adhesions have taken place; but we are not treating of this part of the progress of the splenic disease.

Mercury has appeared to be injurious, excepting as it may be directed to the purpose of purging the intestines and opening their exhalants.

Chalybeate tonics might be expected to be eminently serviceable in the passive state of the splenic vessels; but in this expectation we are disappointed, unless they be given after these vessels and the ligamentous part of the spleen have recovered some degree of contractile power. If the circulation be hurried before this improvement has taken place, or if it be excited at any period of the complaint in an undue degree, the turgescence will be augmented in proportion to the action of the heart and arteries.

If there be any exception to this remark, it must apply in

very depressed states of the habit, the consequence of long protracted illness.

Whenever the spleen is turgid, the blood should be diverted from finding its course to this organ; which is most likely to be effected by determining it to the other vessels of the abdomen and pelvis. In attempting to produce this necessary change, and in the intention of cure, aloës with antimonials and neutral salts have appeared to me to be the most successful instruments, when used twice in the day at least with great perseverance, and not as cathartics are generally prescribed, at intervals longer than twenty-four hours.



Chemical Researches on the Blood, and some other Animal Fluids.

By WILLIAM THOMAS BRANDE, Esq. F.R.S. Communicated to the Society for the Improvement of Animal Chemistry, and by them to the Royal Society.

[From the Philosophical Magazine, for August 1812.]

SECTION I.

Introduction.

IN the following pages I shall have the honour of laying before this society an account of some experiments upon the blood, which were originally undertaken with a view to ascertain the nature of its colouring matter. The difficulties attendant on the analysis of animal substances have rendered some of the results less decisive than I could have wished, but I trust that the general conclusions to which they lead, will be deemed of sufficient importance to occupy the time of this body.

The existence of iron in the blood was first noticed by Menghini*, and its peculiar red colour has been more recently attributed to a combination of that metal with phosphoric acid, by MM. Fourcroy and Vauquelin†. The very slight discoloration occasioned by the addition of infusion of galls to a solu-

* Vincentius Menghinus de Ferrearum Particularum Progressu in Sanguinem. *Comment. Acad. Bonon.* t. ii. p. 2, pag. 475.

† *Système des Conn. Chym.* vol. viii.

tion of the colouring matter, under circumstances most favourable to the action of that delicate test of iron, first led me to doubt the inferences of those able chemists, and subsequent experiments upon the combinations to which they allude, tended to confirm my suspicion, and induced me to give up no inconsiderable portion of the time which has elapsed since the last meeting of this Society, to the present investigation.

An examination of the chyle and of lymph, in order to compare their composition with that of the blood, formed an important part of this inquiry, especially as those fluids have not hitherto been submitted to any accurate analysis, on account of the difficulty of procuring them in sufficient quantities, and in a state of purity. Whilst engaged in assisting Mr. Home in his physiological researches, several opportunities occurred of collecting the contents of the thoracic duct under various circumstances, and in different animals; on other occasions Mr. Brodie has kindly furnished me with the materials for experiment.

SECTION II.

On the composition of Chyle.

The contents of the thoracic duct are subject to much variation. About four hours after an animal has taken food, provided digestion has not been interrupted, the fluid in the duct may be regarded as pure chyle; it is seen entering by the lacteals in considerable abundance, and is of an uniform whiteness throughout. At longer periods after a meal, the quantity of chyle begins to diminish, the appearance of the fluid in the duct is similar to that of milk and water; and lastly, where the animal has fasted for twenty-four hours or longer, the thoracic duct contains a transparent fluid which is pure lymph.

A. The chyle has the following properties.

1. When collected without any admixture of blood, it is an opaque fluid of a perfectly white colour, without smell, and having a slightly salt taste, accompanied by a degree of sweetness.

2. The colour of litmus is not affected by it, nor that of paper stained with turmeric, but it slowly changes the blue colour of infusion of violets to green.

3. Its specific gravity is somewhat greater than that of water, but less than that of blood; this, however, is probably liable to much variation.

4. In about ten minutes after it is removed from the duct, it assumes the appearance of a stiff jelly, which in the course of twenty-four hours gradually separates into two parts, producing a firm and contracted coagulum, surrounded by a transparent colourless fluid. These spontaneous changes, which I have observed in every instance where the chyle was examined at a proper period after taking food, are very similar to the coagulation of the blood and its subsequent separation into serum and crassamentum; they are also retarded and accelerated by similar means.

B. 1. The coagulated portion bears a nearer resemblance to the caseous part of milk than to the fibrine of the blood.

2. It is rapidly dissolved by the caustic and subcarbonated alkalies. With solutions of potash and soda, it forms pale brown compounds, from which, when recent, a little ammonia is evolved. In liquid ammonia the solution is of a reddish hue.

3. The action of the acids upon these different compounds is attended with nearly similar phenomena, a substance being separated intermediate in its properties between fat and albumen. Nitric acid added in excess redissolves this precipitate in the cold, and sulphuric, muriatic, and acetic acids when boiled upon it for a short time.

4. Neither alcohol nor ether exerts any action upon the coagulum of chyle; but of the precipitate from its alkaline solution they dissolve a small portion, which has the properties of spermaceti: the remainder is coagulated albumen.

5. Sulphuric acid very readily dissolves this coagulum, even when diluted with its weight of water; and with the assistance of heat, it is soluble in a mixture of one part by weight of acid, with four of water; but when the proportion of water is increased to six parts, the dilute acid exerts no action upon it. I was surprised to find that the alkalies produced no precipitation in these sulphuric solutions when heat had been employed in their formation, and where a small proportion only of the coagulum had been dissolved, and was therefore led to examine more particularly the changes which the coagulum had undergone by the action of the acid.

On evaporating a solution of one drachm of the coagulum in two ounces of dilute sulphuric acid (consisting of one part by weight of acid with three of water) down to one ounce, a small quantity of carbonaceous matter separated, and the solution had the following properties.

It was transparent, and of a pale brown colour.

Neither the caustic nor carbonated alkalies produced in it any precipitation, when added to exact saturation of the acid, or in excess.

Infusion of galls, and other solutions containing tannin, rendered the acid solution turbid, and produced a more copious precipitation in that which had been neutralized by the addition of alkalies.

When evaporated to dryness, carbonaceous matter was deposited, and sulphurous acid evolved, with the other usual products of these decompositions.

6. On digesting the coagulum in dilute nitric acid, consisting of one part by weight of the acid to fifteen of water, it was speedily rendered of a deep brown colour, but no other apparent change was produced for some weeks; when on removing it from the acid at the end of that period, it had acquired the properties of that modification of fat which is described by Fourcroy under the name of *adeopocire*.*

A mixture of one part of nitric acid with three of water, acted more rapidly upon the coagulum of chyle; a portion of it was dissolved, and when the acid was carefully decanted from the remainder, it was found to possess the properties of gelatine. But when heat was applied, or when a stronger acid was employed, the action became more violent, nitrogen and nitric oxide gas were evolved, and a portion of carbonic acid and of oxalic acid were produced.

7. Muriatic acid in its undiluted state does not dissolve the coagulum of chyle; but when mixed with an equal quantity of water, or even more largely diluted, it dissolves it with facility, forming a straw-coloured solution, which is rendered turbid when the alkalies are added to exact saturation, but no precipitate falls, nor can any be collected by filtration. When either

* *Mem. de l'Acad. des Sciences*, 1789.

acid or alkali is in excess in this solution, it remains transparent.

8. Acetic acid dissolves a small portion of the coagulum of chyle, when boiled upon it for some hours. As the solution cools, it deposits white flakes, which have the properties of coagulated albumen.

9. The action of oxalic acid is nearly similar to that of the acetic, but neither citric nor tartaric acid exert any action upon this coagulum.

10. The destructive distillation of this substance affords water slightly impregnated with carbonate of ammonia, a small quantity of thin fetid oil and carbonic acid and carburetted hydrogen gas.

The coal which remains in the retort is of difficult incineration; it contains a considerable portion of muriate of soda and of phosphate of lime, and yields very slight traces of iron.

C. 1. The serous part of the chyle becomes slightly turbid when heated, and deposits flakes of albumen.

2. If after the separation of this substance the fluid be evaporated to half its original bulk, at a temperature not exceeding 200° Fahrenheit, small crystals separate on cooling, which, as far as I have been able to ascertain, bear a strong resemblance to sugar of milk: they require for solution about four parts of boiling water, and from sixteen to twenty parts of water of the temperature of 60°. They are sparingly soluble in boiling alcohol, but again deposited as the solution cools. At common temperatures alcohol exerts no action upon them. The taste of their aqueous solution is extremely sweet. By nitric acid they are converted into a white powder of very small solubility, and having the properties of saccholactic acid, as described by Scheele.*

The form of the crystals I could not accurately ascertain even with the help of considerable magnifiers. In one instance they appeared oblique six-sided prisms, but their terminations were indistinct.

Some of the crystals heated upon a piece of platina in the flame of a spirit lamp, fused, exhaled an odour similar to that

* Chemical Essays, No. xvii.

of sugar of milk, and burnt away without leaving the smallest perceptible residuum.

3. The destructive distillation of the serous part of chyle afforded a minute quantity of charcoal, with traces of phosphate of lime and of muriate of soda and carbonate of soda.

SECTION III.

Analysis of Lymph.

The fluid found in the thoracic duct of animals that have been kept for twenty-four hours without food, is perfectly transparent and colourless, and seems to differ in no respect from that which is contained in the lymphatic vessels. It may therefore be regarded as pure lymph.

It has the following properties*;

1. It is miscible in every proportion with water.
2. It produces no change in vegetable colours.
3. It is neither coagulated by heat, nor acids, nor alcohol, but is generally rendered slightly turbid by the last re-agent.
4. When evaporated to dryness, the residuum is very small in quantity, and slightly affects the colour of violet paper, changing it to green.
5. By incineration in a platina crucible the residuum is found to contain a minute portion of muriate of soda; but I could not discover in it the slightest indications of iron.

6. In the examination of this fluid, I availed myself with some advantage of those modes of electro-chemical analysis, which on a former occasion I have described to this Society.†

When the lymph was submitted to the electrical action of a battery consisting of twenty pairs of four-inch plates of copper and zinc, there was an evolution of alkaline matter at the negative surface, and portions of coagulated albumen were separated. As far as the small quantities on which I operated enabled me to ascertain, muriatic acid only was evolved at the positive surface.

* The term lymph has been applied indiscriminately to the tears, to the matter of encysted dropsy, and to some other animal fluids. Vide Aikin's Dictionary of Chemistry and Mineralogy, art. *Lymph*.

† Phil. Trans. 1809, p. 373.

SECTION IV.

Some Remarks on the Analysis of the Serum of Blood.

This fluid has been so frequently and fully examined by chemists, that I shall not enter into a detailed account of its composition, but merely state such circumstances respecting it as relate particularly to the present inquiry, and have not hitherto been noticed by the experimentalists to whom I have alluded.

The fluid which oozes from serum that has been coagulated by heat, and which by physiologists is termed *serosity*, is usually regarded as consisting of gelatine, with some uncombined soda, and minute portions of saline substances, such as muriate of soda and of potash, and phosphate of lime, and of ammonia. Dr. Bostock regards it as mucus.*

From some experiments which I made upon the serum of blood, on a former occasion, I was induced to regard the serosity as a compound of albumen with excess of alkali, and to consider the coagulation of the serum analogous to that of the white of egg, and of the other varieties of liquid albumen.

To ascertain this point, and to discover whether gelatine exists in the serum, I instituted the following experiments.

Two fluid ounces of pure serum were heated in a water bath until perfectly coagulated: the coagulum, cut into pieces, was digested for some hours in four fluid ounces of distilled water, which was afterwards separated by means of a filter.

The clear liquor reddened turmeric paper, and afforded a copious precipitation on the addition of infusion of galls, and when evaporated to half an ounce it gelatinized on cooling. It was rendered very slightly turbid by the addition of dilute sulphuric and muriatic acid; but alcohol produced no effect.

From the result of these trials, it might have been concluded that gelatine was taken up by the water; but as an alkaline solution of albumen forms an imperfect jelly when duly concentrated, and as albumen and gelatine are both precipitated by tannin, I was inclined to put little reliance on the appearances just described, until I had examined the solution by the more accurate method of electrical decomposition.

* Transactions of the Medical and Chirurgical Society of London, vol. i. p. 73.

Upon placing it in the Voltaic circuit my suspicions were justified, by the rapid coagulation which took place in contact with the negative wire. I therefore made some other experiments in order to corroborate this result.

One fluid ounce of pure serum was dissolved in three of distilled water: the conductors from a battery of thirty pairs of four-inch plates were immersed in this solution at a distance of two inches from each other; the electrization was continued during three hours and a half, the solid albumen being occasionally removed: at the end of that period, no further coagulation took place, and a mere decomposition of the water was going on.

Having ascertained in previous researches, that gelatine is not altered during the electrical decomposition of its solution carried on as just described, my object in this experiment was, to ascertain whether any gelatine remained after the complete separation of the albumen had been effected. I accordingly examined the water from which the coagulated albumen had been removed, and found that it was not altered by infusion of galls, nor did it afford any gelatine when evaporated to dryness.

Two fluid ounces of dilute muriatic acid were added to one of serum. The mixture immediately assumed a gelatinous appearance; it was heated, and a more perfect coagulation of the albumen took place; the liquid part was separated by a filter. No effect was produced upon it by Voltaic electricity, nor did infusion of galls occasion any precipitation.

I repeated the first experiment with the addition of twenty drops of a solution of isinglass to the serum. The liquid which now separated, after the albumen had been entirely coagulated by the action of electricity, was copiously precipitated by infusion of galls.

It may be inferred from these experiments, that gelatine does not exist in the serum of the blood, and that the serosity consists of albumen in combination with a large proportion of alkali, which modifies the action of the re-agents commonly employed, but which is readily separated by electrical decomposition.

To ascertain whether iron exists in the serum of the blood, one pint was evaporated to dryness in a crucible, and gradually

reduced to a coal, which was incinerated and digested in muriatic acid, to which a few drops of nitric acid were added; some particles of charcoal remained undissolved; the solution was saturated with ammonia, which afforded a copious precipitation of phosphate of lime, accompanied with slight traces only of oxide of iron.

SECTION V.

Some Experiments upon the Coagulum of Blood.

Mr. Hatchett's valuable researches on the chemical constitution of the varieties of coagulated albumen, have shewn that that substance varies but little in its properties, whether obtained from the crassamentum of the blood, or from washed muscular fibre, or other sources; but that the proportion of earthy and saline matter is different in the different varieties.*

It will also be remarked, on referring to the dissertation which I have just quoted, that the ashes obtained by incinerating the coal left after the destructive distillation of albumen, did not contain any appreciable proportion of iron.

Assuming the existence of iron in the colouring matter of the blood, I made the following experiments upon the crassamentum of that fluid.

Two pints of blood were collected in separate vessels. The one portion was allowed to coagulate spontaneously; the other was stirred for half an hour with a piece of wood, so as to collect the coagulum, but to diffuse the principal part of the colouring matter through the serum. These two portions of coagulum were now dried in a water-bath, and equal weights of each reduced in a platina crucible to the state of coal, which afterwards was incinerated. The ashes were digested in dilute nitro-muriatic acid, and the solution saturated with liquid ammonia in order to precipitate the phosphate of lime, as well as any iron which might have been present.

The precipitates were collected, dried, and treated with dilute acetic acid, by which they were almost entirely dissolved, some very minute traces only of red oxide of iron remaining,

* Phil. Trans. 1800, p. 384.

the quantity of which was similar in both cases, and so small as nearly to have escaped observation.

It is reasonable to infer, if the colouring matter of the blood were constituted by iron in any state of combination, that a larger relative proportion of that metal would have been discoverable in the former than in the latter coagulum; but frequent repetitions of these experiments have shown that this is not the case, and the following result appears to complete the evidence on this subject.

The colouring matter of a pint of blood was diffused by agitation through the serum, from which it was allowed gradually to subside, the coagulum having been removed: after twenty-four hours the clear serum was decanted off, and the remainder, containing the colouring matter, after having been evaporated to dryness, was incinerated, and the ashes examined as in former experiments. But the traces of iron were here as indistinct as in the other instances above mentioned, although a considerable quantity of the colouring matter had been employed.

The minutiae of analysis I have purposely excluded, as leading into details which would exceed the proper limits of this paper, and unnecessary in the present investigation. I shall now merely dwell on the principal results which have been obtained, and on the general conclusions which these afford.

SECTION VI.

Researches on the colouring Matter of the Blood.

1. To procure this substance for experiments, I generally employed venous blood which had been stirred during its coagulation: the fibrina is thus removed, and the colouring matter diffused through the serum, from which it gradually subsides, being difficultly soluble in that fluid; on decanting off the supernatant serum, the colouring matter remains in a very concentrated form. When other modes of procuring it were employed they will be particularly mentioned; but as I have not found the serum which is retained interfere much with the effects of various agents upon the colouring principle, the method just noticed was commonly adopted.

2. When the colouring matter thus collected is microscopi-

cally examined, it seems, as Lewenhoeck first observed,* to consist of minute globules. These are usually described as soluble in water, a circumstance which my own observations led me to doubt, and which the more accurate experiments of Dr. Young, an account of which, intended for publication, he has kindly permitted me to peruse, have completely disproved.

3. The effect of water upon the red globules, is to dissolve their colouring matter, the globule itself remaining colourless, and, according to Dr. Young, floating upon the surface.

This aqueous solution is of a bright red colour, and not very prone to putrefaction. When heated, it remains unaltered at temperatures below 190° or 200° Fahrenheit; at higher temperatures it becomes turbid, and deposits a pale brown sediment: if in this state it be poured upon a filter, the water passes through without colour, so that exposure to heat not only destroys the red tint, but renders the colouring matter insoluble in water.

Alcohol and sulphuric ether added to this solution also render it turbid, and when these mixtures were filtrated, a colourless and transparent liquor was obtained.

4. The matter remaining upon the filter was insoluble in water, in alcohol, and in sulphuric ether; but when digested in dilute muriatic or sulphuric acid, a portion was taken up forming a brown solution. I regard this soluble portion as a modification of the colouring matter produced by the operation of heat: the insoluble residuum had the properties of albumen.

5. Effects of Acids on the colouring Matter.

A. Muriatic acid poured upon the colouring matter of the blood, renders one portion of it nearly insoluble and of a bright brown colour: another portion is taken up by the acid forming a dark crimson solution when viewed by reflected light; but when examined by transmitted light, it has a greenish hue.

This solution remains transparent, and its colour is unimpaired by long exposure to light, either in contact with the air, or when kept in close vessels. At its boiling temperature the colour is also permanent.

* Haller Elem. Physiolog. vol. i. p. 51.

Infusion of galls produces no change in this muriatic solution, nor is its colour affected by carbonated alkalies, even when added in considerable excess.

It is rendered brown red by supersaturation with caustic potash, but not with soda, nor ammonia: these, and especially the latter, rather heighten its colour.

When considerably diluted with water its original colour is much impaired, and the green hue, which it always exhibits by transmitted light, becomes more evident.

In preparing this solution, I frequently employed the coagulum of blood cut into pieces, and digested in equal parts of muriatic acid and water, at a temperature between 150° and 200° . In three or four hours the acid was poured off, and filtrated. The clear solution was in all respects similar to that above described, although before filtration it appears of a dirty brown colour.

I evaporated a portion of this muriatic solution in a water-bath, to dryness; it retained its colour to the last, and left a transparent pellicle upon the evaporating bason, of a dirty red colour: this when re-dissolved in muriatic acid acquired its former tint, but the colour of its aqueous solution was nearer brown than red.

B. Sulphuric acid, diluted with eight or ten parts of water, forms an excellent solvent of the colouring principle of the blood.

It may be employed in a more concentrated state; but the bright colour of the solution is in that case apt to be impaired, and when more largely diluted with water, its action is slow and uncertain. Either the sediment of the colouring matter from the serum, or the crassamentum of the blood, may be indifferently employed in forming these solutions.

When dilute sulphuric acid is added to the colouring matter, it renders it slightly purple; and if no heat be applied, the acid when poured off and filtered, is colourless; so that dilute sulphuric acid when cold, does not dissolve this colouring principle.

One part of the crassamentum of blood cut into pieces, was put into a matrass placed in a sand heat, with about three parts of dilute sulphuric acid. It was kept for twelve hours in a tem-

perature never exceeding 212° , nor below 100° . After twenty-four hours the acid was filtered off, and it exhibited a beautiful bright lilac colour, not very intense, and tinted with green when viewed by transmitted light.

This solution is nearly as permanent as that in the muriatic acid. Some of it which has been kept for a month in an open vessel, often exposed to the direct rays of the sun, is very little altered.

When diluted with two or three times its bulk of water, the lilac tint disappears, and the mixture is only slightly green.

When exposed to heat, the colour gradually changes as the acid becomes more concentrated by evaporation, and when reduced to about half its bulk the lilac hue is destroyed.

The solutions of pure and carbonated alkalies when added in excess, convert the colour of this sulphuric solution to brownish red; but in smaller quantities they merely impair it by dilution.

C. Nitric acid, even much diluted, is inimical to the colouring matter of the blood.

A few drops added to the muriatic or sulphuric solutions gradually convert their colour to a bright brown, and larger quantities produce the same change immediately.

The action which this acid exerts upon the colouring matter under other circumstances is nearly similar, and always attended with its decomposition, so that my attempts to procure a red solution in this menstruum uniformly failed of success.

D. Acetic acid dissolves a considerable quantity of the colouring matter of the blood; the solution is of a deep cherry red colour. When somewhat diluted, or when observed in tubes of about a quarter of an inch bore, this solution appears perfectly green by transmitted light. In its other habitudes it nearly resembles the muriatic solution.

E. The solution of the colouring matter in oxalic acid is of a brighter red than those hitherto noticed; that in citric acid is very similar to the acetic solution, and with tartaric acid the compound somewhat inclines to scarlet. All these solutions exhibit the green hue, to which I have so often alluded, in a remarkable degree.

6. Effects of Alkalies on the colouring Principle of the Blood.

The caustic and the carbonated alkalies form deep red solutions of this substance, which are extremely permanent.

1. Solutions of pure potash, and of the subcarbonate, take up a large proportion of the colouring matter of the blood. The intensity of the colour of this solution, when concentrated, is such, that it appears opaque, unless viewed in small masses, or in a diluted state, when it is of a bright red colour.

2. In soda and its subcarbonate, the solution has more of a crimson hue, which colour is extremely bright in its concentrated state.

3. The solution in liquid ammonia approaches nearer to scarlet than that in which the fixed alkalies are employed.

4. When these alkaline solutions are supersaturated with muriatic acid, or with dilute sulphuric acid, they acquire a colour nearly similar to the original solutions in those acids which have been above described.

5. Nitric acid added in small quantities, or even to saturation of the alkaline menstruum, heightens the colour of the three compounds; but when there is a slight excess, a tint of orange is produced, which soon passes into bright yellow.

6. The alkaline solutions may be evaporated nearly to dryness without losing their red colours; during the evaporation of the ammoniacal solution, the alkali flies off, and a brown-red solution of the colouring matter in water remains.

Having ascertained the above facts respecting the colouring principle of the blood, I next proceeded to examine how far it was susceptible of entering into those combinations which are peculiar to other varieties of colouring matter.

These experiments I shall detail in the order in which they were made.

1. Some pure alumine was added to a concentrated aqueous solution of the colouring matter of the blood, and after twenty-four hours the mixture, which had been frequently agitated during that period, was poured upon a filter, and the residuum washed with hot distilled water.

The filtrated liquor had lost much of its original colour; the

alumine had acquired a red tinge; it was dried at a temperature between 70° and 80° , during which it became brown.

2. Two hundred grains of alum were dissolved in four fluid ounces of a solution of the colouring matter, similar to that employed in the last experiment. The colour of the compound was bright red. Liquid ammonia was added, and the precipitate collected, and carefully dried. It was of a dirty red, and after some days exposure to light became nearly brown.

From these, and other experiments which I have not thought it necessary to detail, it appears that alumine will not form a permanent red compound with the colouring principle of the blood; I was therefore next induced to employ oxide of tin.

3. Fifty grains of crystallized muriate of tin (prepared by boiling tin filings in muriatic acid, and evaporating the solution,) were dissolved in four ounces of the solution of colouring matter, which immediately assumed a purple tint, and became afterwards brown. It was diluted with twice its bulk of water, and put aside in a stopped phial. On examining it three days afterwards, a small quantity of a bright red powder was observed at the bottom of the phial, which proved to consist of the colouring principle combined with the metallic oxide. A portion of this compound which has been kept in water for some weeks has undergone no change of colour; but when dried by exposure to air, it loses its brilliant tint, and becomes of a dull red hue.

To a compound solution of muriate of tin and colouring matter, similar to that employed in the last experiment, I added a sufficient quantity of solution of potash to decompose the salt of tin. The precipitate thus obtained was collected and dried by exposure to the air of a warm room. It was of a dull red colour, and has undergone no apparent change by exposure to the joint action of light and air for three weeks.

4. Finding that supertartrate of potash exalted the colour of the blood, I endeavoured to form a compound of it with that substance and oxide of tin, and thus, in some measure, to imitate the process in which cochineal is employed for the production of scarlet dye; but although a bright red compound is produced, when it is dried at a very moderate temperature its

colour becomes similar to that of the other combinations which I have described.

These experiments I repeated in various ways, occasionally applying the salt of tin as a mordant to woollen cloth, linen, &c.; but the brilliancy of the colour was never permanent.

5. Having observed that infusion of galls and decoction of oak bark do not impair the colour of the blood, I conceived that solution of tannin might answer the purpose of a mordant, as it is effectually employed by dyers in giving permanence to some of their red colours.

I accordingly impregnated a piece of calico with decoction of oak bark, and afterwards passed it through an aqueous solution of the colouring matter of blood. When dry, it was of a dirty red colour, nearly similar to that which would have been obtained had no mordant been applied: when however an alkaline solution of the colouring matter was employed, the colour was equal to that of a common madder red, and as far as I have been able to ascertain, it is permanent.

6. A solution of superacetite of lead was impregnated with the colouring matter of the blood. The compound was bright red: no spontaneous change took place in it, and on the addition of an alkali a white precipitate was formed, the fluid retaining its former tint.

From this and other experiments, in which it was attempted to combine oxide of lead with the colouring matter of the blood, it would appear that there is no attraction between those two substances.

7. The most effectual mordants, which I have discovered for this colouring matter, are some of the solutions of mercury, especially the nitrate, and corrosive sublimate.

Ten grains of nitrate of mercury (prepared with heat and containing the red oxide) were dissolved in two fluid ounces of a solution of the colouring matter of the blood. After some hours a deep red compound was deposited, consisting chiefly of the metallic oxide combined with the colouring matter, and a small portion of coagulated albumen. The remaining fluid had nearly lost its red colour.

The nitrate of mercury containing the black oxide produces

nearly similar effects, excepting that the colour of the compound is of a lighter red.

When corrosive sublimate is added to the solution of the colouring matter, its tint is instantaneously brightened, and it becomes slightly turbid from the deposition of albumen. If this be immediately separated by a filter, the liquor which passes through gradually deposits a deep red or purplish insoluble precipitate; and if it now be again filtrated the liquid is colourless, the whole of the colouring principle being retained in the compound which remains upon the filter.

By impregnating some pieces of woollen cloth with solution of nitrate of mercury, or of corrosive sublimate, and afterwards steeping them in an aqueous solution of the colouring matter of the blood, I succeeded in giving them a permanent red tinge, unalterable by washing with soap; and by employing the ammoniacal solution of the colouring matter, calico and linen may be dyed with the same mordant.

In these experiments I was much satisfied by the complete separation of the colouring matter from its solutions, which after the process were perfectly colourless.

SECTION VII.

Some Remarks on the preceding experimental Details.

From the experiments related in the second section of this paper, it appears that sulphuric acid effects changes upon the coagulum of chyle, similar to those which Mr. Hatchett has observed to result from the action of dilute nitric acid upon the coagulated white of egg. This last substance, however, is not convertible into gelatine by means of sulphuric acid, whereas in these respects the curd of milk resembles that of chyle: this circumstance, as well as the more ready solubility of the coagulum of chyle in dilute than in concentrated acids, points out a strong analogy between those two bodies.

The sweet taste of chyle naturally suggested the idea of its containing sugar*; but I am not aware of any direct experiments which have demonstrated its existence, and have therefore detailed minutely such researches as I have been enabled

* Fordyce on Digestion, 2d edition, p. 121.

to make upon the subject, hoping at some future period to render them more complete.

The experiments to prove the non-existence of gelatine in the serum of blood, will, I trust, be deemed sufficiently decisive: they show that that abundant proximate principle of animals is not merely separated from the blood, in which it has been supposed to exist ready formed, but that it is an actual product of secretion.

The proportion of iron afforded by the incineration of several varieties of animal coal, is much less considerable than we have been led to expect; and the experiments noticed in the fifth section show that it is not more abundant in the colouring matter of the blood than in the other substances which were submitted to examination; and that traces of it may be discovered in the chyle which is white, in the serum, and in the washed crassamentum or pure fibrina.

The inferences to which I have alluded, in the first section of this paper, are strongly sanctioned by these facts, and coincide with the opinion which has been laid before the Royal Society, by Dr. Wells*, respecting the *peculiar nature* of the colouring principle of the blood, and support the arguments which are there adduced.

That the colouring matter of the blood is perfectly independent of iron, is, I conceive, sufficiently evident from its general chemical habitudes, and it appears probable that it may prove more useful in the art of dyeing than has hitherto been imagined, since neither the alkalies nor the acids (with the exception of the nitric) have much tendency to alter its hue. The readiness, too, with which its stains are removed from substances to which no mordant has been applied, seem to render it peculiarly fit for the purposes of the calico-printer. I have not extended these experiments, nor have I had them repeated on a sufficient scale to enable me to draw more general conclusions respecting the possibility of applying them with advantage in the arts: this would have led me into too wide a field, and one not immediately connected with the objects of this society: the subject, however, appears important.

* Phil. Trans. 1797.

It is not a little remarkable that blood is used by the Armenian dyers, together with madder, in the preparations of their finest and most durable reds*, and that it has even been found a necessary addition to insure the permanency of the colour†. This fact alone may be regarded as demonstrating the non-existence of iron as the colouring principle of the blood, for the compounds of that metal convert the red madder to gray and black.

Whilst engaged in examining the colouring matter of the blood, I received from Mr. William Money, house surgeon to the general hospital at Northampton, some menstruous discharge, collected from a woman with prolapsus uteri, and consequently perfectly free from admixture of other secretions. It had the properties of a very concentrated solution of the colouring matter of the blood in a diluted serum, and afforded an excellent opportunity of corroborating the facts respecting this principle, which have been detailed in the preceding pages. Although I could detect no traces of iron, by the usual modes of analysis, minute portions of that metal may and probably do exist in it, as well as in the other animal fluids which I have examined; but the abundance of colouring matter in this secretion should have afforded a proportional quantity of iron, did any connection exist between them. It has been observed that the artificial solutions of the colouring matter of the blood invariably exhibit a green tint when viewed by transmitted light: this peculiarity is remarkably distinct in the menstruous discharge‡.

I hope that some of the facts furnished by the above experiments may prove useful to the physiological enquirer: they account for the rapid reproduction of perfect blood after very copious bleedings, which is quite inexplicable upon that hypothesis which regards iron as the colouring matter, and may perhaps lead to the solution of some hitherto unexplained phenomena connected with the function of respiration. There can, I think, be little doubt that the formation of the colouring mat-

* Tooke's Russian Empire, vol. iii. p. 497.

† Aikin's Dictionary, art. *Dyeing*, and Philosoph. Magazine, vol. xviii.

‡ I could discover no globules in this fluid; and although a very slight degree of putrefaction had commenced in it, yet the globules observed in the blood would not have been destroyed by so trifling a change.

ter of the blood is connected with the removal of a portion of carbon and hydrogen from that fluid, and that its various tints are dependent upon such modifications of animal matter, and not, as some have assumed, upon the different states of oxidization of the iron which it has been supposed to contain.

On the Mercurial Plan of Treatment in Dysentery; with Observations on the same Practice as applied to Yellow Fever, and to the Remitting Fevers which often occur in Europe, as well as in the East and West Indies. By WILLIAM FERGUSON, Esq. Inspector-General of Hospitals to the Army in Portugal. Communicated by Dr. MARCET, For. Sec. &c.

[From the Medico-Chirurgical Transactions, Vol. II.]

THE following paper was originally communicated to the Society in the form of a private letter, without any authority to publish it; but having been sent back to the author in Portugal, with a request that he would allow it to be published in the Society's Transactions, with whatever corrections or additions his subsequent experience might suggest, the original document was speedily returned by Mr. Fergusson, accompanied by a letter, of which the following is an extract:—

Lisbon, May 20th, 1811.

“I now return the paper, with full permission to make
 “whatever use of it the Society may think proper. I do not
 “give this permission lightly, for I have revolved and reconsi-
 “dered its contents with all my strength; and really find, that
 “every opinion it contains, so far from being changed, has
 “been gaining additional confirmation ever since I wrote it.
 “In a postscript will be found an extract of a letter from Dr.
 “Gray, Physician to the forces; who has been travelling over
 “the same field of military practice as myself, for an equal
 “number of years (now eighteen), only he has had the advan-
 “tage, which I never enjoyed, of spending a considerable time
 “in the East Indies. He decidedly concurs in the propriety of
 “mercurial remedies for dysentery; and in a late publication
 “by Dr. Gourlay, on the Climate and Diseases of Madeira, there
 “is a decisive testimony in favour of the mercurial practice.”

Portsmouth, November 12, 1809.

* * * * *

* * It is only within a short time, and during the late campaigns in Portugal and Spain, that I have had recourse so frequently to Mercury. I confess myself to be partial to its use, though I may indeed have pushed it beyond the mark. The universal epidemic that there prevailed among every description of military in the field, was dysentery. This, when mild, admitted of an easy cure, by acting on the bowels with mild purgatives, and keeping up their action steadily, but not violently, for a few days. It was cured with nearly the same facility by acting upon the skin without purgatives, through the influence of active diaphoretics. In this way every regimental surgeon, looking to the number of recoveries from his sick list, believed that he possessed a cure for the disease, whether he followed the one or the other mode of treatment. The attack, however, sometimes began with such urgent and violent symptoms, that a power beyond either of these two, became necessary to save the patient; irreparable mischief otherwise ensued, from the violent inflammation, followed by ulceration and thickening of the colon and larger intestines; and the patient, if he survived the acute attack, sunk afterwards a miserable victim of chronic disease. It is probably this form alone, of which I sustained two very severe attacks, that deserves the name of true acute dysentery; the others were local diseases of the lower intestines, in which the general system was little affected, or did not at all sympathise. In the aggravated form, there appeared one never failing symptom which always served me as a guide and diagnostic. The urine was high coloured, even green, scanty, and pungent; and though there were no other discoverable signs of hepatic affection, this was my signal for beginning and pushing the use of mercurial remedies. Half a grain of calomel, with one grain of ipecacuan, was given every hour. This never aggravated the abdominal pains; on the contrary, appeared to alleviate them; or if it did not, some mild saline purgative, as castor oil largely diluted with mucilage of gum arabic gave ease, and permitted the continuance

of the mercury till the gums were affected. This generally took place in forty-eight hours, when a solution of the disease might be looked for with confidence; and of which one of the most certain precursors was the urine reassuming its natural condition. In a few cases, and really in a very few, the disease did not yield after the mouth became sore; and these were then found to be of an obstinate and incurable nature. I had few opportunities of seeing many of that description, but those that came under my view were elderly soldiers, who, from former abuse of spirituous liquors, might be supposed to labour under previously obstructed viscera. In others, again, the use of mercury was neglected, and the patient died. The dissection then exhibited a miserable mass of disease in the great intestines. The colon, its descending portion particularly, being thickened, knotted and ulcerated to an inconceivable degree. The smaller intestines showed little or nothing of these appearances, and we often lost even the traces of disease, till we came to the liver, which uniformly was blackish, hard and wasted; the gall bladder flaccid, and about half full of thin watery bile.

I had an early and painful lesson in the mercurial practice; for in preparing to land in Portugal with Sir John Moore's army, and being exposed to the night dews on the water after a dreadfully hot and fatiguing day of preparation, I was attacked suddenly and violently with dysentery. Purgatives gave only a momentary relief, and notwithstanding the fair trial of other approved remedies, the complaint continued unabated, and in three days I was reduced to extremity. A friend enjoined the immediate use of calomel in grain doses. I had before taken one or two large doses as purgatives, which probably quickened the effect; for in about fifteen hours, I perceived the coppery taste in my mouth, and from that moment I may say, I felt that the disease was gone: my spirits and appetite revived, and I no longer thought of dying.

I need not say, that this early lesson was an instructive one. The whole army was more or less dysenterically affected, but by administering mild diluted purgatives to the slighter cases, and boldly mercurialising, even by inunction, which I believe to be the best practice, the severest, the deaths from the disease, in the regimental hospitals, where the greater part of the

sick were treated, scarcely exceed one in two hundred. Many of these were of course trifling, but all were dysenteries; and showed the diagnostic symptoms of tenesmus and of mucous evacuations without any admixture of bile or fæces. In some the disease might be said to be entirely local, and confined to the lower part of the intestinal canal. The patient felt no constitutional disturbance, and could do his duty; but was troubled with an irritation, like that from ascarides, about the rectum; to which, if he yielded, the irritation was increased, with frequent, scanty, mucous stools, and tenesmus. My direction was always, if possible, to resist the inclination to enforce the passage of the natural fæces, at least once a day, by some purgative, and to wear a broad flannel roller swathed round the whole of the abdomen: this often succeeded without confinement.

It may strike you as strange, that in almost every stage of the acute disease, I considered opium to be hurtful, and even dangerous. The temporary ease which it afforded from the tormina of the bowels, was generally succeeded by worse symptoms; and besides, the same degree of relief was much more effectually obtained by mild purgatives, which were otherwise productive of permanent benefit. Astringents of every kind, during the acute stage, were even worse than opium. When the excessively acrid discharge that came from the bowels was examined, it was easily to be seen, that it could not be locked up in the intestines with impunity, and that the patient could only expect to be easy from having its exit facilitated. During convalescence, and when the natural passage of the fæces was restored, there could be no objection to the use of any of the tonics and astringents; but amongst these opium held no place.

From all these facts, I came to an early conclusion, that though it was little discoverable from any symptom but the condition of the urine, yet that we were to look to the liver, principally, for the source of the disease. The apparent seat of the complaint was to be seen in the intestines themselves; and the action of purgatives upon them may be supposed sufficient to change the diseased, and to induce a new action; but still the grand organ of the bile was to be specifically stimulated,

and its ducts steadily emulged, and duly opened by the operation of mercury, before a cure could be expected.

Dysentery, from my experience of it in Holland, the West Indies, and South of Europe, I believe I can declare to be in no case contagious. I never saw any thing like it, except in Holland, after the weather became cold, when it was seen as a symptom or irregular local form of typhous fever; but more could not then be said, than that it was about to be swallowed up in the prevailing epidemic, and formed a combination, rather than a distinct type of disease.

True dysentery is the offspring of heat and moisture; of moist cold in any shape after excessive heat: nothing that a man can possibly eat or drink would ever give him true dysentery. A chill from dry cold air would produce a different affection; but the more penetrating forms of moisture, such as lying on damp ground in the hot season, or being exposed to the night dews, or to a stream of chilling exhalations after violent rains, when the system has been relaxed by previous heat, seldom fail to bring it on. Marsh miasma would beget fevers of its own generic type, and moist cold alone, not preceded by heat, would manifest its action by inducing rheumatic, pneumonic, or catarrhal fever, according to circumstances. I know not, whether the ascertained indispensability of previous heat in the production of dysentery, will be admitted as a proof of the hepatic system always participating in, and being, in fact, a seat of the primary symptoms. Certain it is, however, from the state of the urine, that there must at least be spasm, or collapse and inaction, of the biliary ducts; and the wasted appearance of the liver, far beyond what could be expected from general constitutional exhaustion, gives countenance to the supposition of its functions having been disordered and impeded.

There is another disease, happily for this country little known amongst us, where mercury, not empirically used, but duly applied at the proper stage and period, I hold to be a great, and probably the *only* remedy upon which much reliance could be placed—I mean the remittent fever, which rages throughout the world, wherever a marshy surface is exposed for a sufficient length of time to a powerful sun. It is by far the

most universal of all the forms of fever, and whether it comes out an ague from the fens of Lincolnshire, the endemic remittent (commonly called the yellow fever) of the West, or the Jungle or Puckah fever of the East Indies, it is only a modification of effect from the same cause. Its mode of invasion constitutes at once its decided difference from our typhous fever. In typhus, the symptoms insidiously creep upon the patient; but in remittent fever the attack is at once powerful and decided, and all the powers of the system appear to be called into action against the newly applied poison. We cannot know whether this increased action (commonly called re-action) becomes, from its violence, dangerous to life, or whether the unsubdued power of the original cause finishes the work of destruction; but we know that the whirl and hurry of the circulation, if not moderated by artificial means, soon terminates in deposition upon, or determination to, some of the important vital organs, to the large abdominal viscera of the liver and spleen, more particularly the first. In hot climates, this determination is generally fatal; but in the remittent fever of Europe, more particularly that of Holland, it is often the commencement of chronic, irregular fever, with imperfect convalescence, and frequent relapses; from which (the acute symptoms being past) at first little danger is apprehended. Our practice should be regulated accordingly. Mercury, during the violence of the first symptoms, would in all probability have done mischief, by increasing the effects of general stimulation; but in the second stage, it must, from its known qualities, have powerful effects in rendering pervious the obstructed viscera: without it, I believe that tonics and stimulants would only do harm, by rousing the system into undue efforts, from which it must sink exhausted; but duly combined, the vital powers may be made to go hand in hand with the artificial action of the mercury. The liver, being the first object of congestion and determination, it might appear good practice, while the general invasion is kept in check by the vigorous means of depletion and refrigeration from without, to use calomel for the purpose of keeping open and emulging its inner emunctories; but I conceive this method would be too tedious to serve any good purpose, and that the

treatment at the beginning ought to be purely and generally antiphlogistic.

A question may here arise, respecting the propriety and extent of venesection. When used early, and before determination has been marked, I hold it to be the most powerful means of preventing the bad consequences that may otherwise be expected to ensue. It ought, therefore, in the young, sanguineous soldier, to be generally and decidedly practised, on the first invasion. If it has no other good effect, it will, at least for a time, enable the practitioner to hold the reins, and render the system more amenable to the action of remedies, more particularly sudorifics; but if delayed till congestion has taken place, it will then enfeeble the vital powers, and diminish the means and chances of the obstruction being overcome.*

The application of cold under any chance or suspicion of obstructed viscera, may form another question, but it can never surely be unsafe to diminish accumulated heat by any means not too violent; and though I should not fear to use the cold effusion, I doubt not that simple ablution or spunging would be perfectly effectual.

This chronic and irregular form of the Walcheren fever, is now treated at many of our military hospitals with success by mercurials only; and as the medical officers become enlightened by inspecting the bodies of those that die, I doubt not that it will become universal. It has been long my belief, that remittent fever does not endure many days without producing the effects above mentioned. As in the yellow fever of the West Indies, the patient may die in this country from the violence of the general symptoms; but I believe that death is still more certainly and frequently induced, by determination to, and injury of, some vital organ. The liver, I am convinced, was there primarily and principally affected. The patient could not live till it suppurated and ruptured, but it was always enormously

* The superstitious disuse of the lancet at the beginning of soldiers' diseases, which are then almost always inflammatory, amounting almost to a proscription of the remedy, through the prejudice of the schools, and the false inferences deduced from its effects on the debilitated subjects of private life, has caused more deaths, or at least prevented more lives from being saved, than any other fault in military practice.

congested, and its secretions so changed that, in place of the natural balsamic bile, it appeared to distil poison into the intestines. When we opened the bodies, the gall bladder was always found impacted with a black, tenacious, pitchy substance, as thick as common tar, and, at its communications with the intestines, they (the intestines) were in a state of low, erysipelatous, even semi-gangrenous inflammation. If we could suppose the albuginea of the eye in a jaundiced person to be in a state of inflammation, it would give the exact idea of their appearance. The patient seemed to die through the effect of incessant vomiting; the stomach was also found in a state of inflammation; but as this symptom seldom shewed itself till the disease was considerably advanced, we may suppose that the stomach being sympathetically affected by the presence of this acrid bile in the neighbouring intestines, regurgitation was produced by nausea; and that thus the poison was first received into that viscus whence it could never be expelled, as every effort for that purpose produced an augmentation of the original quantity. Were the heat as great in Walcheren, we should no doubt find the liver as much a sufferer, and an *agent*, as at St. Domingo; for in Portugal, after the battle of Vimeira, I met with the purest cases of yellow fever, in some regiments encamped amongst marshes; and at Sheerness in Kent, during the autumnal heats of the year preceding, while I was the Inspector of the districts, fevers occurred, which, for violence of symptoms, and strongly marked hepatic affection, might justly have been classed with West India diseases.* The defective sensi-

* The endemic remittent, though the most general, is not the only form of yellow fever; and the most dreadful mortality has ensued from that disease, where it was impossible even to suspect the agency of miasmata in any shape. In fact, all the young, the sanguineous, and robust, were its victims, and could not be saved from its attack, as long as they continued to possess European vigour, and until they had been relaxed by the climate, and entirely lost the rigidity of muscular fibre which they had brought from their own country. The invasion, progress, and termination of this type of fever, seemed to follow the same course as those of the endemic remittent, although it must have arisen from a different source, because it broke out where miasmata could not exist, and where exposure to the solar rays was most evidently the exciting cause. Amongst our unfortunate soldiers, intemperance, costiveness, plethora, youth, and the highest tone of muscular fibre, under

bility of the liver, more particularly under disease, has for ages deluded the dying patient and his medical directors. It was the current belief, till lately that their eyes have been opened by freer communication with the East, that liver complaint never occurred in the *West Indies*; and while I was there, it was common for the practitioners to boast of their curing agues and dysenteries by mercury, without their having the smallest suspicion of the true source of the disease.

In the great field of military practice, I am not disposed to abandon my opinions in favour of mercury, notwithstanding that in private practice it may often be very empirically and absurdly resorted to. I have seen the same amongst ourselves in the *West Indies*, where some of the advocates for mercury, as if to save themselves the trouble of thinking, blindly and preposterously pushed its use under all circumstances.

I may conclude the recapitulation of my creed by saying, that in dysentery I would use it to rouse from inanition, or inaction, the torpid liver, and restore to the smaller intestines their healthful bile; for without it they perform no duty, but

every supposable excitement from the senses, all predisposed to disease, and prepared the human frame, as if it had been a combustible body, to explode into fever before the torch of the sun. Why the solar rays do not exert a corresponding baleful influence on the sands of Egypt, or in other climates equally hot or hotter than the *West Indies*, or why the same effects were not felt even there to the same degree previous to the year 1793, is beyond our ken; and in all probability will never be discovered to us, any more than those other conditions and modifications of the atmosphere, which, independent of the qualities of soil, afflict us with influenzas and other epidemic diseases. When I first went to the *West Indies*, I had no doubts on the subject, because the contagious nature of Yellow Fever formed as much an article of my creed, as that of plague or small pox does now; but I had been there only a very short time, when, in spite of my prejudices, I was obliged to open my eyes to the irresistible conviction that broke in upon me from all quarters, of its not being capable of being propagated by contagion; and during the whole time that I remained in the country (several years) I never saw the smallest reason to alter that opinion. I do not pretend to say, that the punishment which is ordained against the undue accumulation of human effluvia, and neglect of ventilation in crowded ships, hospitals, or prisons, would not be manifested by the production of temporary pestilence in the *West Indies*, the same as in any other climate; but I fully believe, that the Yellow Fever, under ordinary circumstances of ventilation and cleanliness, is never contagious.

permit the stricture on the larger ones to continue unresolved, and thereby run its course of obstruction and ulceration: and in remittent fever, when the violence of the acute stage has been past, I should equally depend on its specific stimulating power, to render pervious the obstructed viscera. Relapses would not then occur; for the axe will have been laid to the root of the evil; and in dysenteries cured by mercury, the same happy result may be expected to attend. Experience at least tells me so, as I have seen many a patient restored to vigorous health, with regular bowels, within a few weeks after having sustained an attack that might have been supposed to render him valetudinary for years. I have found few agents of much power in the *materia medica*; but mercury I hold to be one which, when skilfully wielded, may be applied to accomplish the most important purposes of medical practice; but exactly in the proportion that it is powerful, so is the danger of using it needlessly and improperly, or of committing its administration to unskilful hands; and I must own, that I have seen it commit sad havoc even in dysentery, when prescribed for slight cases, and persisted in till it became difficult to distinguish between the disease and the mercurial action in the bowels.

WM. FERGUSSON.

(Postscript.)

Lisbon, May 20, 1811.

When the foregoing letter was sent out to me here about a month ago, for correction, preparatory to its appearing before the public, I showed the contents to my friend Dr. Gray, who has favoured me with the following observations upon it, dated April 14, 1811.

“ I have read your paper on dysentery with much interest, from the striking coincidence in your practical views with what has fallen under my own observation, when with the army in the East Indies, as well as in different parts of Europe. Indeed I have also long been an advocate for the employment of mercury in dysentery, from ample proofs of its success both in the acute and chronic stages, only delaying its use in the former, till the milder modes of treatment are either found inadequate, or the disease assumes an alarming aspect.

Experience, however, has led me to trust chiefly to the introduction of mercury into the system, by means of friction, in the proportion of $\mathfrak{z}\text{i}$. of the strong mercurial ointment twice, thrice, or even four times in the day, according to the urgency of the case, and carried the length of not merely affecting the gums, but inducing ptyalism to the extent of an English pint, or even more, daily; which effect must be kept up for a week or longer, if the disease do not give way, and the patient's strength will bear it: and I can safely aver, that, in this way, mercury has not only very often succeeded after the failure of every other remedy and mode of treatment that could be devised, but has even rescued some desperate cases, when no reasonable hope of recovery could be entertained. When the mouth becomes what the patients term *very sore*, though without much spitting, there is pretty generally an abatement of the dysenteric symptoms; but the mercury requires to be pushed the length mentioned, effectually to stop the disease. Still it must not be imagined, that I have not found mercury to fail in dysentery; for unfortunately the reverse is the fact. But I will venture to assert, that the mercurial plan, employed before the organic mischief is irreparable, or the debility and emaciation irrecoverable, affords the most successful mode of treatment hitherto employed; not merely in the inter-tropical dysentery, or rather hepatirrhœa, (when the acrid biliary secretion, irritating, and eventually ulcerating, the intestines, is often the first symptom of a diseased liver) but also in dysentery, as described by nosologists, and occurring during European campaigns; the symptoms of which differ considerably from those of the former, and in which I cannot help thinking that the liver is seldom to be looked to for the source of the disease. When the mercurial plan has failed, change of climate, when practicable, and not delayed till the last extremity, sometimes succeeds in bringing about recovery.

“I have thus briefly stated the result of what I have seen and practised, in the treatment of a disease, that often proves the scourge of armies; without indulging any conjectures on the *modus operandi* of the remedy.” (Signed).

J. GRAY.

“In regard to the treatment of this disease, (says Dr. Gourlay) I hold it of the utmost consequence that the proximate cause, the peculiarly morbid inflammation of the intestines, be constantly kept in view; for it appears from dissection, to be in every case directly or indirectly the cause of death. That plan of cure then ought to be the best, which forms its indications from the view of removing this proximate cause. According to this plan, to remove the peculiar morbid inflammation, to unload the bowels, to relieve uneasy symptoms, and to restore to the intestines their healthy action, are the general indications to be formed. The best and most effectual means of answering at once all these indications, according to my experience, is the use of calomel alone. This medicine, exhibited in doses of six, eight, or ten grains, repeated at intervals, determined in their length of time by the previous effects of its action, and the other circumstances of the patient, has been uniformly found to unload the bowels, and to keep them open; to relieve the uneasy symptoms of tormina and tenesmus, and even of vomiting, if present; to raise the pulse, and remove that languid look and general depression, so constantly attendant on this disease. To judge from these effects, the probability is, that it also operates in some peculiar way; in a way, perhaps, analogous to its mode of action, when applied externally to an ill-conditioned ulcer, upon the morbid inflammation of the intestines, so as to remove it. In regard to astringents and opiates, I have seldom found occasion for such articles, unless where the free evacuation of the intestines was neglected in the first instance, or large doses of such debilitating cathartics as aloes, colocynth, jalap, rhubarb, or clysters, containing acrid materials, had been administered for this purpose. Indeed I have found calomel to be not only the best remedy in the beginning, for unloading the bowels, and relieving uneasy symptoms, but also in the latter stage, to be the best and softest anodyne.”

Observations on the Natural History, Climate, and Diseases of Madeira, during a period of eighteen years. By Wm. Gourlay, Fellow of the Royal College of Physicians, Edinburgh, and physician to the British factory at Madeira, London, 1811. 8vo. p. 135, 136.

Some account of the Effects of Arsenic in counteracting the Poison of Serpents. Communicated in a letter from Mr. J. P. IRELAND, Surgeon to the fourth battalion of the sixtieth regiment of foot, to THOMAS CHEVALIER, Esq.—Read before the Medico-Chirurgical Society, June 12, 1811.

[From the Medico-Chirurgical Transactions, Vol. II.]

SIR,

HAVING heard you mention in your lectures, "that the Indians were in the habit of administering arsenic in large doses, after the bites of venomous animals; and that you would strongly recommend to gentlemen who might have opportunities of trying its effects in such cases, to exhibit it, in order to ascertain its powers," I resolved to make trial of it whenever an opportunity offered; and I have great pleasure in having it in my power to acquaint you with the following important facts, which occurred under my own observation during several years residence in the West Indies.

In some of the islands at present in our possession, venomous serpents are very numerous, and one of the most deadly in its bite is found in the island of St. Lucia; it is from three to six feet in length, and appears to be the *Cohuber Carinatus* of Linnæus. Its fangs are from one and an half to two inches long;* and the wound inflicted by them is generally of considerable extent.

On my arrival in the island, I was informed that an officer and several men, belonging to the 68th regiment, (then quartered there, and to which I was attached,) had died within a few months from the bites of those destructive animals; that every thing had been tried by the attending medical men, to no purpose, as all the patients had died, some in six, and others in about twelve hours, from the time of their receiving the wound.

A case, however, soon came under my own care, and as

* Several specimens of the fangs I brought home with me have been unfortunately mislaid. I hope, however, to be able to show them to you soon.

nothing that had been done before seemed to be of any avail, I determined on trying the effects of arsenic to its full extent.

CASE I.

Jacob Course, soldier in the York light infantry volunteers, was bitten in the left hand, and the middle finger was so much lacerated that I found it necessary to amputate it immediately, at the joint with the metacarpal bone.

I first saw him about ten minutes after he had received the wound, and found him in a torpid, senseless state: the hand, arm, and breast of the same side were much swelled, mottled, and of a dark purple, and livid colour. He was vomiting, and appeared as if much intoxicated. Pulse quick and hard: he felt little or no pain during the operation.

The wound being dressed, and the patient put to bed, I ordered a cathartic clyster, and the following medicine to be taken immediately: \mathcal{R} liq. arsenic. $\mathfrak{z}\text{ii}$;* tinct. opii gt. x. aq. menth. pip. $\mathfrak{z}\text{iss}$.; which was added to half an ounce of lime juice, and as it produced a slight effervescence, it was given in that state: this remained on his stomach, and was repeated every half hour for four successive hours. In the mean time the parts were frequently fomented with common fomentation, and rubbed with a liniment composed of ol. terebinth. $\mathfrak{z}\text{ss}$; liq. ammon. $\mathfrak{z}\text{ss}$. and ol. oliv. $\mathfrak{z}\text{iss}$. The cathartic clyster was repeated twice when the patient began to be purged; the arsenical medicine was now discontinued. He became more sensible when touched, and from that time he gradually recovered his faculties; he took some nourishment and had several hours sleep.

The next day he appeared very weak and fatigued; the fomentation and liniment were repeated. The swelling diminished gradually; the natural colour and feeling returned, and by pro-

* The Solutio Mineralis Arsenici was carefully prepared by myself agreeably to Dr. Fowler's prescription; which directs sixty-four grains of arsenic, and as many of the fixed vegetable alkali, to be dissolved in a sand heat, and the solution to be made an exact pint, so that two drachms contain one grain of arsenic in solution.

per dressings to the wound, and attention to the state of his bowels, he soon recovered and returned to his duty.

CASE II.

— Dover, a black soldier in the 3d West India regiment, was bitten in the left hand; the swelling was not so extensive as in the former case, and the discoloration was not so strongly marked. I saw him within a few minutes after he was bitten, and vomiting, senselessness, and torpor, had commenced. The wound inflicted was not of so large extent; I removed the torn edges of the lacerated integuments, dressed the wound, and gave him the arsenical medicine precisely as in the former case; the fomentation and liniment were also applied; the cathartic clyster given every hour, and the medicine repeated every half hour for four hours, when purging came on, and the medicine was discontinued, after which he had some hours repose.

The next day he appeared less debilitated, and he soon recovered, and returned to his duty.

CASE III.

Thomas Rally, of the 68th regiment, was bitten in the calf of the right leg, and brought to the hospital in nearly the same state as Jacob Course; the ragged edges of the integuments were immediately removed, the wound dressed, and the arsenical medicine administered; a cathartic clyster was ordered, and the fomentation and liniment applied. After he had taken the medicine every half hour for three hours, severe vomiting came on, so that the stomach rejected every thing that was taken: the cathartic clyster was, however, repeated every hour for four hours, when purging came on. In about two hours afterwards the vomiting ceased, and he took tinct. opii gt. xx.; spt. æther. vitr. gr. xv.; aq. menth. pip. ζ iss.; after which he became quiet, and remained so for several hours.

Next day he was still much debilitated, and had much difficulty in voiding his urine; it was, however, drawn off with a catheter twice a day for two days, and fomentations applied to the region of the bladder. On the third day every aggravating

symptom began to abate, and from that time he gradually recovered and returned to his duty.

CASE IV.

Patrick Murphy, of the 68th regiment, was bitten in the wrist. I saw him within a few minutes after the wound had been received. The hand and arm of the same side had begun to swell, and were even mottled; but vomiting had not come on. I removed the torn edges of the integuments, dressed the wound, and gave him the arsenical medicine. The cathartic clyster was also ordered, and the fomentation and liniment applied; he took the medicine every half hour for three hours, when he appeared much recovered, and it was discontinued. The symptoms did not run so high as in any of the former cases. The fomentation and liniment were continued for two days, from which period he gradually recovered and returned to his duty.

These were the only cases I had an opportunity of seeing during my stay in St. Lucia; but some time after I went to the island of Martinique, where a venomous serpent is found of a smaller size, from one to two, and two and a half feet long, and its fangs about an inch in length, the bite of which is as deadly as of those found in St. Lucia. I was present when a soldier belonging to the 63d regiment received a wound in the leg from one of those serpents, and I requested the surgeon of the regiment to allow me to try the effects of arsenic; he was very glad to give me the case, as he had not before seen one of the kind.

The patient was treated precisely in the same manner as those in St. Lucia, and when I left the island on other duty, a few days afterwards, I had the pleasure to leave him so well, that I do not entertain a doubt of his having perfectly recovered.

From this it appears that very happy effects may be produced by the administration of arsenic in large doses, in cases of this nature, as every one in which I tried it recovered; and, I trust, these facts will be the means of throwing some light on a subject of the greatest importance to the inhabitants of our

colonies, and will be found to merit the attention of those who are more competent to reason on the nature of the effects thus produced.

I have the honour to be, sir,

Your most obedient and humble servant,

J. M. IRELAND,

Surgeon 4th batt. 60th regt.

London, October 21, 1811.

NOTE BY MR. CHEVALIER.

I was induced to recommend the trial of arsenic in these cases from the facts recorded in Dr. Russell's History of Indian Serpents, on the authorities of Mr. Duffin and Mr. Ramsay, and of which a good account may be found in the London Medical Review and Magazine for March and April, 1799. From these it appears that the Tanjore pill, of which arsenic is in all probability the chief ingredient, is exhibited with considerable success in India after the bites of venomous serpents. The composition of this medicine is as follows: "White arsenic, roots of vellinavi, roots of neri-visham, kernels of nervalam, pepper, quicksilver, of each an equal quantity. The quicksilver is to be rubbed with the juice of the wild cotton till the globules become invisible. The arsenic, being first levigated, and the other ingredients reduced to a powder, are then to be added, and the whole beaten up together with the juice of the wild cotton to a consistence fit to be divided into pills of six grains each." Each pill, therefore, contains nearly one grain of arsenic, which is given in the state of white oxyd. It was a matter of doubt with me, before I received Mr. Ireland's communication, whether the other ingredients might not have some share in moderating or counteracting the immediate effect of arsenic on the stomach itself. But it did not appear at all unreasonable to suppose that where such sudden and extreme debility is produced as takes place from the bites of serpents, a much larger dose of a powerful remedy might be taken with impunity than could be borne in any ordinary state of the human frame. In Mr. Ireland's cases, the arsenic was also given in the state of white oxyd, as the liquor arsenicalis would be decomposed by the lime juice; but the medicine being swallowed instantly as that decomposition was effected, the arsenic would be more diffused in the stomach than if exhibited in a pill; and perhaps this mode of giving it is on that account to be preferred.

In two out of three of the successful instances related by Dr. Russell, the Tanjore pill produced copious vomiting; in one purging also, and in one the operation was gentle by stool and perspiration only. In those now read to the Society it seems to have operated chiefly by purging, which was very judiciously promoted by repeated cathartic clysters.

It remains for future observation to determine whether any, and what advantage would arise from giving the arsenic in solution instead of in the state

of oxyd; and whether this powerful remedy might not be employed with success in tetanus and hydrophobia. Dr. Russell mentions his having given the Tanjore pill to fourteen persons bitten by mad dogs. It operated by purging; but as the symptoms of hydrophobia do not appear to have supervened, the efficacy of the medicine in that dreadful disease still remains for future experiments to determine.

T. CHEVALIER.

Note referring to Mr. CHEVALIER's Case of Lithotomy, p. 265.

Dr. WOLLASTON has been so good as to analyse the matter voided by the patient, whose case is described in the above paper, (see p. 270), and finds it "to be principally a remnant of a coagulum of blood, surrounded, as might be expected, by a medley of those concretions which usually form on any substance retained in the bladder; viz. triple phosphate of magnesia, phosphate of lime, and uric acid."

T. CHEVALIER.

A chemical account of various Dropsical Fluids; with remarks on the nature of the Alkaline Matter contained in these Fluids, and on the Serum of the Blood. By ALEXANDER MARCET, M.D. F.R.S. one of the physicians to Guy's hospital.

[From the Medico-Chirurgical Transactions, Vol. II.]

The limits of the present number would not permit us to introduce Dr. Marcet's very ingenious experiments; but we avail ourselves of the general view of their results, as drawn up by that able chemist and physician; believing that such will be acceptable to those who take an interest in physiological inquiries.

As there are but few readers to whom chemical details are interesting, and as most of them may be glad to obtain some general notions of the results, without wading through a mass of experimental evidence, it may be proper to retrace, in a few words, the leading points of this inquiry.

It appears, in the first place, that the prevailing animal substance, not only in serum, but in all the morbid fluids which have been examined in this essay, is albumen, or coagulable matter; which substance, however, these fluids contain in very different proportions.

In all of them, also, another kind of animal substance, which may be called muco-extractive matter, (from its being incoagulable, and from its being soluble in water or other menstrua), is uniformly discoverable.

Gelatine, it would appear, is not discoverable in any of these fluids; a singular circumstance, from which it seems natural to infer that the formation of gelatine is the result of a specific secretion.

In some of these fluids, namely, those of ascites, hydrothorax, hydrops pericardii, hydrocele, and that which is sometimes effused in the thyroid gland, the albuminous matter is so considerable as to render them coagulable; that is, convertible into an uniform semi-solid mass, by the agency of acids, or by a temperature of 165 degrees. In others, on the contrary, namely, in the fluid of spina bifida, of hydrocephalus, and of hydatids, the quantity of albuminous matter is so small, as scarcely to be rendered visible by heat or acids.

The specific gravity of these fluids is likewise remarkably various. That of the fluid of hydrocephalus, for instance, is under 1007; whilst that of serum sometimes exceeds 1032. Different specimens of the same fluids are also found to vary in their specific gravities. This is especially conspicuous with regard to the serum of blood, some specimens of which do not exceed 1024, whilst others rise to 1032,5. Even in the same individual, and during the continuance of the same disorder, differences of specific gravity are observable in serum obtained at different periods. Thus, also, it is found that dropsical fluids from different cavities of the body, collected after death from the same individual, differ materially in regard to their specific gravities.

Upon further examination it is found that these differences affect principally, and perhaps exclusively, the animal matter of these fluids; the saline matter contained in them not being subject to similar variations.

These saline contents, on the contrary, are found to be remarkably uniform in the different fluids, both as to their proportions and their chemical nature; and the same uniformity prevails whatever differences there may exist in these fluids in regard to the animal matter they contain. Thus, serum of

blood, and the fluid of hydrocephalus, yield the same saline substances, and very nearly in similar proportions, although the one contains about eighty times as much animal matter as the other.* The proportion of saline matter yielded by the various animal fluids concerned in this inquiry, may be generally stated to be between 8 and 9 grs. in 1000 grs. of fluid.

The particular saline ingredients contained in all these fluids appear to be, muriat of soda, muriat of potash, sulphat of potash, soda, and phosphats of lime, iron and magnesia. And a mass of 100 grs. of these salts appears to consist of about 72 grs. of muriat of soda, mixed with a little muriat of potash; between 18 and 20 grs. of soda, brought to the state of subcarbonat; and a mixture of 8 or 10 grs. of sulphat of potash, phosphat of lime, phosphat of iron, and phosphat of magnesia. Potash, therefore, as Dr. Pearson first stated, is present in the animal fluids; but I believe I have satisfactorily shown, that it exists in the state of muriat, or sulphat; soda being the only alkali discoverable in an uncombined state.

The caustic alkali contained in these fluids appears to be combined with their animal matter, the properties of which it modifies in a manner which is not yet well understood;† and it would seem that the proportion of uncombined alkali to that of the other salts is greater, as the specific gravity of the fluid is more considerable.

These circumstances, and in particular the remarkable variations which are observed in the proportions of animal matter contained in the blood of different persons, or of the same person at different periods, derive considerable interest from their probable connexion with health and disease, and from the new pathological views which a full investigation of the subject might suggest.

* A table, exhibiting the general results of all the above analyses, will be found at the end of this paper.

† Mr. Brande, in his "Observations on Albumen, &c." published in the *Philosoph. Transact.* for 1809, has made an ingenious attempt to explain the agency of alkali in albuminous fluids.

TABLE

Showing the proportions of saline and animal matter in various dropsical fluids, and in the serum of blood.

<i>In 1000 grs. of Fluid.</i>				
	Specific Gravity.	Total of Solid Contents.	Quantity of Animal Matter.	Quantity of Saline Matter.
		Grains.	Grains.	Grains.
Fluid of Spina Bifida	1007	11,4	2,2	9,2
—— Hydrocephalus . . .	1006,7	9,2	1,12	8,08
—— Ascites	1015	33,5	25,1	8,4
—— Hydrothorax . . .	1012,1	26,6	18,8	7,8
—— Hydrops Pericardii .	1014,3	33	25,5	7,5
—— Hydrocele	1024,3	80	71,5	8,5
Serum of Blood*	1029,5	100	90,8	9,2

* The specific gravity here stated is an average. That of the particular specimen under examination was 1024,5.

SELECTED REVIEWS.

Cases of Apoplexy and Lethargy; with Observations upon the Comatose Diseases. By J. CHEYNE, M. D. Fellow of the Royal College of Physicians, Edinburgh, of the King and Queen's College of Physicians in Ireland, &c. &c. London 1812. 8vo. pp. 224.

[From the Edinburgh Medical and Surgical Journal, for July 1812.]

THIS is the work of a diligent and faithful observer, who has already distinguished himself as a clinical student. Early introduced to extensive and general practice, with a zeal and industry highly praise-worthy, Dr. C. has continued to note the cases of his patients, to record any important observation, to study, in detail, the living features of diseases in the sick-chamber, and to trace the connexion between symptoms and disorganization, by inspecting the bodies of the deceased. In thus contemplating the phenomena of hydrocephalus acutus, and preparing the materials of his essay on that disease, his attention was naturally directed to the general pathology of the brain; and the work now before us is, in part, the offspring of this study. That it had become necessary to reconsider the history and treatment of apoplexy, will very readily be acknowledged, when we recollect the late controversy which arose out of a dispute on a point of practice, between Dr. Langslow and Mr. Crowfoot, and with what animosity and contradiction of fact and argument, that controversy was maintained in the journals of the day. The argument too of Dr. Fothergill against blood-letting in apoplexy, had, we believe, influenced the understanding of too many practitioners, and restrained the use of the most powerful remedy we possess for the prevention or cure of this disease. To those who have entertained any doubts on this subject, we recommend a careful study of Dr. Cheyne's cases and observations. The work is truly clinical, and completely instructive on this point. The author is merely the historian of what he has seen, of what, indeed, all may see who choose to open their eyes. He has no particular conceit or hypothesis to deform the picture, and his obser-

vations are generally inductive, and when otherwise, are hazarded with the most becoming candour and modesty. The general history of apoplexy is good, and conveys a very just picture of the disease. It contains, however, no observation of sufficient novelty or importance to detain us. We wish, perhaps, that Dr. Cheyne had dwelt more particularly on the presaging signs and symptoms of disease which mark the apoplectic diathesis, and precede often, for a long time, an impending attack.

His account of the morbid appearances exhibited on dissection claims more particularly the reader's attention.

In dividing the scalp, there is often a great flow of blood from the occipital and frontal veins; indeed, during the whole of a dissection, the blood flows from all parts of the head; first from the superficial veins, and then in streams from the sinuses, so that the quantity collected amounts to one or two pounds, or even more. The dura mater is sometimes thickened, and bound to the cranium by the strongest adhesions. The tunica arachnoides is occasionally found thickened and opaque, and the pia mater remarkably vascular; the veins are not only turgid, but there often appears, also, high arterial action, evidenced by a bright vermilion tint, scarlet extravasations, the membrane seeming as it were bloodshot. Between the pia mater and arachnoides, there is often observed serous effusion, colourless, turbid, bloody, and even mixed with streaks of coagulable lymph.

The substance of the brain is often unusually firm, and when cut into, the numerous points of blood shew that the divided vessels are enlarged. The ventricles are often enlarged, and contain serous fluid in considerable quantity.

“For the most part, extravasated blood is found within the cranium, sometimes between the membranes, sometimes in the substance of the brain. Sometimes, bursting the walls and floor of the ventricles, we find a great effusion of blood both in the substance of the brain and in the ventricles. Coagulated blood has been found in various parts of the cerebrum and cerebellum of the same subject; and it has been found in the theca vertebrarum. I have never seen extravasation of blood on the surface of the brain, which did not appear to have arisen

from a rupture of its substance; but in a case communicated to me by a friend, the blood seemed to have flowed from a number of the smaller arteries of the pia mater.”—“ When blood is extravasated into the substance of the brain, it is contained in a cavity, the walls of which are uneven and ragged; and in this irregular cavity, the substance of the brain is generally so mixed with blood, that we cannot wash the blood away without carrying along with it portions of the medullary matter.”

He has seen the basilar and internal carotid arteries considerably enlarged. But the extravasation of blood seldom if ever is found to proceed from the rupture of a considerable branch; it has never occurred to his own observation. He denies the general or frequent existence of aneurisms, ossification, or other evident diseased state of the arteries of the brain, as the predisposing cause of these effusions and extravasations of blood in the brain, which almost always arise from the minuter vessels of its substance.

“ It is not by the scalpel alone, that the anatomist can demonstrate the state of the vessels which pour the blood into the substance of the brain during apoplexy; but in many cases after he has exposed the seat of the extravasation, he may, by means of a syringe, or by a patient use of a camel’s-hair pencil, by washing away the broken portions of the brain, and carefully removing the larger masses of the blood, at last, all along the walls of the irregular cavity, show many vessels not larger than a human hair, ending in small clots of blood; and he will sometimes find the same appearance in various and distinct parts of the same brain. Hence it seems, that the bleeding does not depend on erosion, nor is it owing to aneurism, nor ossification, but to a great and simultaneous action of the smaller arteries of a hemisphere, or of the whole brain; an action which, strong as these arteries are, they in general are unable to bear without a rupture of their coats.”

Generally, then, the appearances observed in the brain of apoplectics may be thus summed up:—

“ The remains of an excited state of the minute arteries of the brain and its membranes, this probably being the most important, as it is the most unvarying appearance; then the

extravasation of blood, probably the consequence of the excited state of the vessels; the turgescence of the venous system; the enlargement of the ventricles, partial and general; and lastly, the serous effusion which is generally found in various parts of the brain, and which would seem to imply previous absorption of the brain. Again, apoplexy," he observes, "is probably not so sudden a disease as is generally thought; or rather the attack appears connected with changes which have been going on for a considerable time. This opinion is supported by the duration of the disordered functions, which denote the apoplectic diathesis, and by the various appearances which are observed in dissection: the substance of the brain is changed in consistence; the membranes have lost their transparency; and we seldom make a dissection after apoplexy, without detecting preternatural serous effusion."

Such is the condition of the brain in the disease distinctively called *sanguineous* apoplexy. The existence of *serous* apoplexy has been by some entirely denied. It is surely of much rarer occurrence; and the symptoms which have been described by authors as distinguishing it, are not to be trusted to, as they have repeatedly been observed in those cases, which dissection has afterwards proved to have been sanguineous. In one case only of the many which have been attended by Dr. Cheyne, have the appearances of serous apoplexy been exhibited on dissection; there was extensive serous effusion, without extravasation or congestion of blood; the substance of the brain was unusually soft; but even here, the pia mater exhibited signs of inflammation, and the increased number of its minute blood-vessels, bore testimony to the co-existence of increased vascular action.

"When we find, after a fatal case of apoplexy, that we can uncover the brain, without the escape of a single drop of blood; that the brain is soft and colourless; the ventricles enlarged, and perhaps distended with serum; the plexus choroides pale; we see a very different disease from what is described in this volume at such length, and which Galen has emphatically characterized, '*multo nimirum sanguine in principium animantis confertum irruente.*'"

He has been told by a celebrated anatomist,

“That the morbid appearances of the brain, after what was considered serous apoplexy, when instantaneously fatal, as when a man walking quietly along has dropt down dead in the streets, have sometimes barely enabled him to give such an account of the dissection, as might seem to explain the patient’s death. And in confirmation of this remark, Mr. Fyffe the anatomist informs me, that in several instances he has scarcely been able to detect any morbid appearances in the heads of persons who had died suddenly, as was supposed, of serous apoplexy. Perhaps a little watery effusion on the surface of the brain, between the convolutions, or in the ventricles, was all he had to note.”

The fourth letter of Morgagni, which treats of serous apoplexy, contains fifteen or twenty cases, with dissections; but of these only three appear to belong to this variety. Upon the whole, Dr. Cheyne infers, that serous apoplexy, compared with sanguineous, is a very rare disease. We are still left in the dark during the life of our patients, as there are no symptoms sufficiently characteristic of it, to distinguish it from cases of sanguineous congestion and effusion. The aged, the pale, and leucophlegmatic have had the brain lacerated and injected with blood.

These pathological observations are of the utmost importance. It appears that, in almost every case of apoplexy, there is a high excitement of the vessels of the brain; that the effusion of blood, no less than the serous effusion, proceeds generally from minute vessels, from a number of extreme branches, and not from the rupture of any larger trunk or branch; and consequently that much may be done to obviate the diathesis, and when the attack has taken place, to recover the patient, by preventing or moderating the effusion. The most prompt and effectual means of doing this, would seem to be, to lessen the excitement and turgescence of the vascular system, by unloading the vessels, and lessening the propulsive power of the heart and larger arteries. And this is surely the means which the experience of ages has shown to be the most prompt and effectual. The most obvious means of accomplishing our indication, has indeed been calumniated, and by some physicians neglected. Dr. Cheyne has, therefore, at great length, redargued the sub-

ject, and removed, we think, every objection which can be opposed to blood-letting, which he is convinced is not only the most effectual remedy in apoplexy, but much more effectual than all others in use. Our own experience, which has not been inconsiderable, and we may add, we believe, that of all the physicians of this school, entirely coincides with that of our author. Nothing can be more fallacious, than the celebrated observation of Dr. Fothergill. Of those who are attacked with apoplexy, undoubtedly many die, and others who survive remain paralytic in some of their limbs; because the brain has already suffered irreparable injury from effusion of blood, and laceration of its substance; an effect which blood-letting never can occasion, which it never is known to produce in other diseases, and which never follows epistaxis, or other natural hæmorrhagies, however profuse, but which such evacuations are most likely to obviate and prevent. The only case, perhaps, in which we would hesitate to bleed, is serous apoplexy. To the inference drawn from this case, as an argument against blood-letting as a remedy in apoplexy, Dr. Cheyne replies:

“The physicians who object to blood-letting in apoplexy lest the attack should be of the serous kind, are bound first to teach us how to distinguish this species; and secondly, to prove, that blood-letting is injurious to a patient in serous apoplexy; neither of which they have done.

“Cases are recorded, in which the vessels of the brain have been found gorged, or in which blood has been extravasated, in pale, relaxed, emaciated old men and women, who have led a life of temperance, or even abstemiousness; therefore, the existence of serous apoplexy is not determined by the appearance, the age, sex, nor even by the habits of the patient; yet these are the circumstances upon which the diagnostic hitherto has been rested. Most professional readers know how long and how well Morgagni and Portal have studied pathology; yet we in vain seek in the writings of either for certain means of distinguishing serous from sanguineous apoplexy. For the mere practical physician, Portal indeed has cut the knot, by recommending the same treatment in both varieties.”

The case of serous apoplexy is comparatively a rare one, and even in it there are marks of vascular excitement. Dr.

Cheyne tells us that he has attended fifty fatal cases of apoplexy, and of these only one was a case of serous apoplexy.

“Now,” he observes, “admitting this proportion, that there are fifty cases of sanguineous apoplexy which require the physician’s assistance, for one of serous, (and as some distinguished physicians have altogether denied the existence of serous apoplexy, it is probable that I have not overrated the proportion), we may find an argument in favour of blood-letting, which will not be easily overturned upon the relative frequency of the two species of the disease.”

In the treatment of apoplexy, we must recollect the urgency of the case, and the cause which is destroying the brain. Our object is to diminish vascular excitement, and to prevent or moderate a destructive effusion, which would put an end to life; and, as in pneumonia, we must persevere till this object is accomplished, or till there is no longer hope of accomplishing it. A few ounces of blood will not do this in either case. We must bleed largely, and repeat the operation according to the necessity of the case. “It ought to be known,” says our author, “that from six to eight pounds of blood have been taken from a person by no means robust, before the disease, which ended favourably, began to yield.”

The other remedies which are commonly employed in apoplexy are emetics, purges, and blisters. On each of these Dr. Cheyne has favoured us with excellent remarks. He enters into the argument on the subject of emetics, and discusses it at considerable length. He has shown, we think, in a very satisfactory manner, that where the stomach is evidently overloaded by recent crapulence, this evacuation, excited by the most gentle means, may become necessary and useful; but that generally emetics are improper remedies in apoplexy. Purgatives are, on every principle of reason and experience, to be preferred for relieving the stomach and *primæ viæ* in this disease. Of blisters, his experience does not speak very highly. They do not seem very applicable, more particularly in the beginning of apoplectic attack; and though he has often had recourse to them, he has never distinctly seen a patient in apoplexy relieved by blistering.

Having concluded his general history of apoplexy, and

thrown much interesting light on the pathology and the therapeutics of this disease, our author proceeds to the relation of his cases and dissections, twenty-three in number, which is followed up by a luminous and instructive commentary. But these observations, however valuable, our limits oblige us to pass over for the present.

We must, however, take some notice of our author's opinions on the subject of lethargy. His observations have led him to question the propriety with which Dr. Cullen has classed such diseases as catalepsia, extasis, carus, cataphora, and lethargus with apoplexy, between which and these diseases there is, he thinks, a distinction which should be restored.

A fair and delicate scrofulous girl, Dr. Cheyne had repeatedly seen affected in the following manner: "Her eyes became fixed, and without expression; her eye-lids dropt, but not so completely as to cover the pupil; her complexion did not change; she was to every appearance insensible, and her breathing was so low that it was not to be heard. Her body lay in the position in which it was when the fit seized her. She had no warning of these attacks, which generally lasted some minutes; her friends knew the fit was over when they heard her sigh. She died before she reached her fifteenth year, of an attack of *melæna*."

Such cases as this, cases of somnolency, of sudden confusion, and loss of memory, with little or no diminution of the power of sense and motion,—cases in which the patient is torpid, and passes much of his time in sleep, so deep that he cannot easily be roused, and when excited to look up, or answer a question, again relapses into profound sleep,—differ widely from apoplexy in many particulars; and, until the time of Dr. Cullen, were carefully distinguished from it, by the names of lethargus, cataphora, and carus.

There are considerable affinities, however, between all these diseases; and, notwithstanding the very judicious observations now before us, there still appears to be much difficulty attached to this inquiry. It may be easy to decide upon a case of lethargus, or even of cataphora, but between carus and apoplexy the diagnosis is obscure, and from the slightest case of lethargy, to carus, or apoplexy, there seems almost an insensible gradation.

“A sudden and permanent loss of recollection, with torpor and somnolency, has been called a paralytic attack; but when unaccompanied with loss of muscular power, or of sensation, it is with more propriety to be considered as lethargic.”

Undoubtedly, in such a case, the distinction is evident. But in the extreme case of lethargy, as in *carus*, the patient is not to be excited by noise, shaking, or even by pricking or pinching the skin. In *carus*, any attempt to rouse him is unavailing.

Again, in the beginning of apoplexy, the patient may be excited,—he starts when pricked with the lancet, but as the disease advances towards a fatal termination, he becomes more and more insensible, and no kind of excitation affects him. Indeed, Dr. Cheyne has alleged, that it is by no means uncommon to see *carus* after apoplexy itself; the patient, after a certain time, becoming pale, with a slow depressed pulse, breathing softly, but totally inexcitable. Thus then, lethargy, catapora, and apoplexy, and *carus*, are in regular sequence, and sometimes pass into each other; and if we take serous apoplexy, as another link, we shall find the whole subject still perplexed with infinite difficulty.

Generally, however, it appears, that there is not a necessary or constant connexion between lethargic and apoplectic diseases. A propensity to sleep, and a forgetfulness of recent events, are the leading symptoms of lethargy,—symptoms which are often found to occur without any loss of sensation or of voluntary motion; and persons in hemiplegia are often in possession of every intellectual faculty;—their memory may be unimpaired, and so far from being lethargic, we not unfrequently find them restless, and complaining of want of sleep.

It appears also, that these different states of lethargy and apoplexy are represented by different states of the brain. In lethargic complaints, the diseased appearances are most remarkable on the surface of the brain, which is found covered with serous effusion; and the membranes, particularly the arachnoides, under which much of the watery deposition is confined, are opaque. There are marks also of previous excitement; and the substance of the brain, especially the cortical part, is flaccid and moist. In apoplexy and palsy, the diseased appearances are sanguineous and serous effusion into the ventricles and substance of the brain.

Observations on the contracted Intestinum Rectum, and the Mode of Treatment, accompanied with Cases illustrative of the different morbid Appearances attendant on the Complaint. To which are subjoined, two Engravings of the Disease. By W. WHITE, Member of the College of Surgeons, London, and one of the Surgeons to the City Infirmary and Dispensary, Bath. Small 8vo. Bath. 1812. pp. 86. two plates.

[From the London Medical and Physical Journal, for May 1812.]

THIS little practical work is divided into seven sections. The first section consists of general remarks on the contracted rectum. Dr. Sherwen, Mr. White considers as the first person who wrote a history of the contracted rectum; and his paper on the subject was printed in the second volume of the *Memoirs of the London Medical Society*. It does not appear, however, that Dr. Sherwen was acquainted with the disease in its early stage, or under the form of simple stricture. But, as it is evident that some of the old practical writers were acquainted with this disease, and that Mr. Pott, in his lecture on diseases of the anus, notices stricture of the rectum, Mr. White can mean only that Dr. Sherwen was the first who wrote expressly on the subject. Since the period of Dr. Sherwen's publication, the disease has been frequently noticed; and the profession is particularly indebted to Mr. Copeland for a more correct knowledge of "stricture of the rectum," as elucidated in his "*Observations on the principal diseases of the Rectum and Anus*," published in 1810. According to Mr. White, the contracted rectum is a rare disease, for, out of 37,000 patients who came under his immediate notice in the course of twenty-four years, only fourteen cases of this disease occurred, or something more than one in two thousand. But Mr. White does not intend to acknowledge or admit its unfrequency, but rather that it has been misunderstood and overlooked. In this stricture-making age, however, the probability is that stricture of the rectum has often been imagined, and that the ruling passion has often created when it intended to describe a natural fact. Be this as it may, the disease occurs often enough,

and is of sufficient importance to interest the public in all investigations concerning it.

The second section contains "Remarks on the Diagnosis of the Disease." The insidious nature and slow progress, the similarity of symptoms arising from other causes affecting the intestinal canal, render the pathognomonic signs of the disease so precarious and uncertain, that we apprehend Mr. White has much benefited the profession by giving the symptoms as they arise.

Those which more particularly indicate the presence of this disease in its early stage are, says Mr. W.

"Habitual costiveness, occasional uneasiness arising from a sense of fulness in the course of the transverse arch of the colon, but more especially towards the termination of the sigmoid flexure; the patient is also sometimes sensible of the aggravation of this symptom, from the quality or quantity of the food which is taken. There is also an uneasiness in the rectum on going to stool, attended with some difficulty in voiding the fæces. As the disease advances, the alvine excretions becomes gradually more scanty; the fæces are smaller figured than those which are natural, and are often discharged with a squirt. After an evacuation, a sensation commonly continues for some time, as if the whole of the fæces had not been expelled, which by degrees goes off, until the next time of going to stool, when a similar sensation occurs."

To these symptoms we shall add a train of phænomena characteristic of this disease, as given by Dr. Robert White in the fourth volume of the memoirs of the London Medical Society.

"When a person somewhat advanced in life, is troubled with frequent constipation, complains of fulness and weight in the stomach, with repeated inclination to discharge the contents, and uneasy rumbling in the belly and distension in the lower part of it, with a sensation of numbness toward the upper part of the sacrum, extending down the rectum; repeated fruitless efforts being also made to pass a stool, attended with a sense of constriction and tenesmus high up in the rectum, and flatus, which seemed to the patient to occupy the intermediate space, bursts forth; clysters failing as well as medicines, and

the complaint unattended with fever or pain; it will be reasonable to expect some mechanical obstruction in the passage."

Dr. Sherwen, in the publication before cited, considers diarrhœa as one of the earliest symptoms of this disease; this, however, Mr. White controverts, and observes that the disease will be found to be in a very advanced stage, whenever a spontaneous diarrhœa takes place. We would particularly press on the attention of our readers the diagnosis of this disorder, because it frequently exists for a long period before it is detected, and acquires a permanence and stability to resist the curative process, which, perhaps, do not appertain to its early stage. It must be distinguished from the schirro-contracted rectum, from schirrous uterus, from diseased prostate, and from dysentery. Dr. Sherwen and Dr. Robert White, in the *Memoirs of the London Medical Society*, Siebold *Dissertatio de Morbis Intestini Recti*, Wrisberg *de preternaturali Intestini Recti*, &c. Mr. Copeland on the Diseases of the Rectum and Anus, with the work now before us, will afford the means of understanding this disease, as far as printed details go: the book of nature must supply the rest.

The third section treats "*of the Modes of Examination, and the usual Morbid Appearances.*"

The actual state of the intestine is only to be ascertained by the *tactus*. Whenever we have a suspicion of the complaint, a manual investigation must be employed.

"This ought to be performed in the most careful and attentive manner, seeing there is a possibility of mistaking the complaint either for a diseased prostate gland or a schirrous uterus, especially if the hardness and tumefaction is attached to the cervix uteri or back part of the vagina. In prosecuting the examination, the first step to be taken is to introduce the finger (oiled) as high up the rectum as possible, at the same time desiring the patient to bear down, as if going to stool. For, if the examination is first made by introducing a bougie, it may happen, that the instrument is pushed between the folds of the intestine, particularly if there should be particular laxity of its internal membrane; and the practitioner may be led to suppose there is a stricture, when in reality none exists. If, however, on introducing the finger, neither stricture nor

induration can be discovered in the rectum, a small-sized bougie must be introduced, and passed as high as the termination of the colon; because there may be a stricture at that part only, although we commonly meet with one, two or three inches lower. And this I believe will generally be the case, when the superior stricture has been of long standing: analogous to what happens in strictures of the urethra.

“ Sometimes it happens that the gut is so much contracted as to render the introduction of the finger impracticable, and the passage will only admit a middle-sized urethra bougie, and sometimes only a small probe.”

The diminution of the calibre of the rectum is produced by various alterations in its organization. Sometimes there is only a diminution of the diameter of the canal, perhaps, in its whole length; at others, annular strictures are discovered, or schirrus surrounds and fills up its cavity; and sometimes tubercles obstruct the passage. For further observations, and the morbid appearances detected by dissection, we must refer to the pamphlet.

The fourth section contains the Prognosis. When the stricture is simple, does not extend beyond the sigmoid flexure of the colon, and the patient's general health is unimpaired, the prognosis is favorable. If the disorder is of long standing, the intestine much thickened and indurated, and the general health sensibly declining, with sallow countenance, hectic pulse, &c. the prognosis is unfavorable. Mr. White speaks positively here to an important fact: *whether the disease be simple stricture or confirmed schirrus, it is equally fatal if left to itself*. This fact is confirmed by Mr. Copeland.

Section five inquires into the “ Cause of the Disease.”

Mr. White asserts, that the complaint is produced “ by a morbid action essentially different from that of inflammation. It appears (he adds) highly probable that the glandular structure of the rectum may form the predisposing cause of the disease; and it is also presumable, that the accumulation of hardened fæces, and the pressure occasioned by their passage through the intestine, and the violent straining thereby induced, may prove the general exciting cause.”

The method of treatment is explained in the sixth section.

As it evident that a dilatation of the contracted passage is the *sine qua non* of the cure, a strong analogy has led to the mechanical means employed in other strictured parts; but these require to be used with discrimination, caution and considerable reserve. The author examines with freedom the methods employed in this case by others; and the opinions and practice of Wiseman, Pearson, Dessault, Sherwen, Rob. White, Darwin, Charles Bell, and Copeland, pass in review.

The treatment of the disease, as laid down by Mr. White, is divided into two branches, general and medical, and local or surgical. The great object in both is to keep down pain and irritation while the distensive means are carrying on, or the remedies employing to remove the disease if it have a specific origin. Bougies, &c. are only admissible when they can be employed without creating great pain and irritation; sometimes the stricture, if not longitudinal, may be divided by the knife; emollient enemata are always useful; and, where anodynes are required, the *extractum Hyosciami* is to be preferred, as it has not the property of occasioning constipation.

The seventh section is particularly valuable by its facts, containing fourteen cases of contracted rectum, treated by the author; to which two plates are annexed, shewing the appearance of the diseased intestine as ascertained by dissection.

Case of Palsy cured by Titillation; with some Observations on the Effects of Titillation on the Nervous System; by JAMES WARDROP.—From the novelty of the remedy, the fortunate result, and the ingenuity of Mr. Wardrop's remarks, we are induced to give our readers the principal part of his detail.

[From the London Medical and Physical Journal for September, 1812.]

“A man twenty-three years of age, in the month of April, 1810, when with the army in Portugal, was seized with a fever, which was at that time epidemic among the troops. In consequence of repeated attacks of the disease, he remained for nearly twelve months in the different military hospitals of Coimbra, Lisbon, &c. Besides what he described as the febrile dis-

ease, he had a severe affection of his head, for which he was bled profusely; and, when he returned to Britain, he had a complete paralytic affection of the left side. By living in the country, he regained a good deal of strength; and he was able to move, though in a very small degree, the paralytic arm and hand. Soon after this, the complaint in his head returned with its former violence, but, by copious and repeated bleedings, the giddiness and stupor, which were the chief symptoms, were removed. The paralytic affection of the left side, during this attack, became more complete; and, although his general health improved, yet, in the beginning of August last, notwithstanding the most rigid antiphlogistic treatment, and a continued use of blisters and electricity to the affected side, the limb continued feeble, and his arm and hand perfectly useless.

“ When I saw him at this period, which was the middle of August last, eighteen months from the commencement of his illness, he had a marked halt in the left leg, and the left arm hung motionless, not having the power of even producing any sensible movement with any of his fingers. The arm, too, was considerably wasted; the hand œdematous, with occasional pains about his shoulder; his pulse a little full and frequent; his tongue furred, and a tendency to head-ache. After completely emptying his bowels by aloetic purgatives, and cupping him in the neck, by which treatment all the febrile symptoms, and those of determination of blood to the head, seemed to be removed, I began to try the effect of *titillation*.

“ The process which was employed to titillate was extremely simple. A person was directed to draw a feather gently over the surface of the skin on the palm of the hand, until it excited laughter; and I purposed that this should be done three or four times a-day.

“ On trial, it was found that the desired effect could readily be produced. At first it was found that a considerable time was necessary to excite laughter; but, the more frequently the application was employed, the more quickly it was accomplished. He found, too, that the laughter was produced much more speedily when he was tickled by another person, than when he used the feather himself; and that it was most easily excited,

by applying the feather to the part of the palm where it is marked by the flexion of the thumb.

“ The beneficial effects which the titillation produced on the paralytic arm, exceeded my most sanguine expectations.

“ After employing it a few days, he began to feel as if the limb were re-animated, a sensation which lasted a short time after each fit of laughter. This sensation was soon followed by a power to produce a sensible and voluntary motion of the fingers, which daily increased; so that in about a month from the commencement of the use of the titillation, he could grasp his hand with a moderate firmness, and move, in like manner, the elbow and shoulder joints. After this period, the strength of the limb was rapidly regained; and in two months from the commencement of this treatment, I met him in the street carrying a bundle under the affected arm.

“ The titillation was also used to the lower extremity of the affected side, the feather being applied to the sole of the foot, where it failed not to produce a speedy and great degree of laughter.

“ Besides the titillation, it ought to be mentioned, that I also advised him to rub the limbs with the dry hand, morning and evening; and this was done with a view not only of removing the œdematous swelling, but also of producing an additional excitement on the skin. I have seen the patient four months after the above treatment had been employed, when he remained perfectly well. I am aware that the event of any new mode of treatment, in an individual instance, cannot be sufficient to warrant any general conclusion. The case, however, seems to me to afford an interesting illustration of the influence which the functions of the skin have on the nervous system, and to open a channel for observation and experiment, in various diseases of that system, which may lead to important improvements in their treatment. Under that impression, I have ventured to lay these remarks before the public, in their present form; and with the hopes that, by their early communication, the good effects of the practice may be established by the ample experience of others.

“ It may be remarked, before concluding these observations, that a good deal of discrimination must necessarily be employed

in selecting cases where titillation is likely to prove beneficial, and in determining the extent in which it may be prudent to employ such a remedy. As long as the paralytic affection seems to depend on an increased quantity of blood in the encephalon, or to arise from any morbid alteration in the structure of the brain, or its coverings, all attempts by titillation, or other means, to recover the power of the paralytic nerves, must be fruitless, if not highly dangerous. Titillation appears to me to be applicable to those cases only where the primary affection is removed, and where the palsy, which was merely one of its symptoms, alone remains. How far titillation may have an effect in alleviating the excruciating pain of *tic douloureux*, sciatica, and some other affections which seem chiefly confined to nerves, experience can alone determine. Titillation, when employed in the treatment of diseases, must, like other powerful remedies, be at first used with caution; and we are enabled to vary the extent of its effects, from tickling to laughter, or even convulsion.

“ Every one knows, from personal experience, the two first degrees of its effects. There are, I believe, many instances of its having produced convulsions, and I have heard of one case where it proved fatal. In all probability, the effects of titillation, as a remedy, should be confined to the excitement of laughter, which in old or obstinate cases may be excited even to an immoderate degree.

“ It is, perhaps, difficult to determine how far titillation acts directly on the affected nerves, or indirectly through the medium of the brain; the latter appears to be the most probable opinion; and, if this be found to be the case, it may be equally beneficial to titillate the skin of the sound as of the paralytic limb, thus obtaining a more extensive, and a more efficacious, mode of applying titillation as a remedy. The influence of mental emotion on the nervous system, and on the vital and animal functions, has not yet met with that consideration in the treatment of diseases which it appears to merit. The effects of music in some of these diseases, and the variations of the same disease in individuals, under the influence of different mental emotions, prove this influence, and might lead us to expect that great beneficial advantages might be derived, from acting on the minds of those afflicted with such complaints.”

The Morbid Anatomy of the Human Gullet, Stomach, and Intestines. By ALEXANDER MONRO, jun. M.D. F.R.S.E. Professor of Medicine, Anatomy, and Surgery, in the University of Edinburgh, &c. &c. &c. Large 8vo. Edinburgh, 1811. pp. 592. xxi plates.

[From the London Medical and Physical Journal, for June 1812.]

IN giving an analytical view of this large volume, the distribution of the subjects adopted by the author will be followed;* and though, perhaps, his arrangement is not the most perspicuous possible, yet, by treading in his footsteps, we shall present our readers with a more satisfactory account of his work, than could arise out of any attempted alteration of his plan, according to any notions of our own.

The Introduction of xxv pages, is occupied with general observations on the advantages arising out of this branch of professional study; and in an elucidation of some particular points of importance. The peculiar advantages of the study of *morbid anatomy* he author enumerates under the five following heads.

“1st. This study, by elucidating the nature and progress of diseases connected with a derangement of organic structure, affords a sure foundation upon which an opinion may be grounded, respecting the nature and progress of such diseases.

“2d. As the study proves that parts similar in their structure are subject to the same organic derangements, it exposes the fallacy of many hypotheses which have been propagated respecting organic diseases.

“3d. If parts of a similar structure be subject to similar organic derangements, *morbid anatomy* may tend to unfold the structure of many of the smaller parts of the human body, which have hitherto escaped observation, as it shows that many of these smaller parts are subject to the same organic derange-

* “The arrangement adopted differs a little from that of preceding authors; for, instead of describing in continuance all the organic derangements of the gullet, of the stomach, or of the intestines, I have classed under one head the same diseases in the different parts of the alimentary canal, following rather the arrangement of diseases than parts.” *Introd.* xix.

ments as those organs whose structure is obvious to our unassisted senses.

“4th. *Morbid*, like *comparative anatomy*, assists in distinguishing those organs which are essential to life, from others of less importance, and also shows that every part, even of the same bowel, is not equally sensible or equally necessary to the prolongation of life.

“5th. This study points out the uncertainties and deficiencies of many parts of medical science, and particularly as to the method of cure; and hence may pave the way to a new and improved method of treatment.”

These general observations on the advantages arising from examining and understanding the diseased alteration of structure in various parts of the animal frame, are illustrated by the particular examples of diseased liver, hernia, and stricture of the urethra.

“The pressure of the enlarged liver may interrupt the functions of the stomach; or the same cause, impeding the free circulation of the blood through the different bowels of the belly, as well as through the liver itself, may produce a dropsy of the belly. The enlarged liver is the source of still further mischief; by pressing upon the gall ducts it impedes the free passage of the bile into the intestinal canal; and the bile thus obstructed, passes off by another channel, and is taken up by the lymphatic vessels, occasioning jaundice. Nor is this all the evil to be apprehended from the affection we are considering. By means of inflammation, the enlarged liver may be united with the neighbouring parts; and if, in such a situation, an abscess should take place within, the contents of the abscess might be discharged into the general cavity of the belly, into the sacs of the pleura, or even into the lungs.

“The progress of the disease called rupture, or hernia, affords another and very striking example of the importance of the study of *morbid anatomy*; for even the most accurate knowledge of the anatomy of the body, in its sound state, conveys but an imperfect idea of the state of the displaced parts, or of the state of the canal through which the displacement has been propagated. The displaced portion of the intestine pushes be-

fore it the thin, slippery, and elastic, peritonæum, which lines the belly; and, after such an occurrence, the lining soon loses its natural characters, being converted into a dense, lamellated membrane, which frequently contracts adhesions with the neighbouring parts. The intestines, during the different stages of the disease, are more or less twisted, compressed, and often inflamed. By consequence of the displacement, their coats become thicker, as also the neighbouring cellular substance.

“Of the preceding remarks, the disease called stricture of the urethra affords a very strong illustration. In the earlier stages of the (this) disease it only produces a membranous growth, which, in its future progress, is converted into ligament, and even into cartilage; and the neighbouring parts are frequently reduced to the same morbid state. In addition to the pain and difficulty in discharging the urine, the usual concomitants of stricture, the disease often occasions various constitutional symptoms: among these may be enumerated great nervous irritation, despondency, in some cases bordering upon delirium, and in other cases, symptoms similar to those which accompany an ague.”

If the examination of diseased parts, *post mortem*, according to the rules of anatomical science, and with a reference to the symptoms during life, had needed a recommendation to those who feel the value and the advantage of collecting facts, Dr. *Monro's* Introduction would be particularly valuable; and, should there be any professional persons who still doubt the importance of this species of investigation, we refer them to the arguments here employed.

Before we proceed to a view of the contents of this volume, we shall venture a few cursory observations on the language employed in it, as well as in some other works, of the present period.

Morbid anatomy for the anatomy of diseased parts—Morbid poison for the contagious or infectious material generated in certain diseases—Female complaints for the diseases of the female sex—are expressions of doubtful import at best; and would always mislead without a previous paraphrastic explanation. This affected conversion of words, made, perhaps, with

a view to compression, has done much toward destroying the perspicuity of the language of science. According to accepted usage, they express something very different from what is intended. Thus a female complaint is a disease of the feminine gender—morbid anatomy is the science itself in a state of disease. A thousand analogies will prove this to be the precise sense of the language: a gratuitous admission at first, may, in time and by custom, however, give to this phraseology, perhaps, a legitimate establishment. In the fluctuations of taste, many wilder innovations may arise; or we may return to the old standard.

“*Multa renascentur, quæ jam cecidère; cadentque,
Quæ nunc sunt in honore vocabula, si volet usus;
Quem penès arbitrium est, et jus, et norma loquendi.*”

“Much phrase that now is dead, shall be reviv'd;
And much shall die, that now is nobly liv'd,
If custom please; at whose disposing will
The pow'r and rule of speaking resteth still.”

The practice of others has usually been brought in excuse of employing what is incorrect in itself. Thus far Dr. *Monro* is supported in the title of his work; but we think it strange that a professor in a liberal and learned science, at one of the first schools in the world for teaching that science, should employ colloquial barbarisms in place of the language which the science itself furnishes, and which all *his* readers would better understand. Why should the disgusting term *gullet* be substituted for the naturalized *œsophagus*? The doctor apologises for his language on the ground of his being employed on subjects of more importance. Perhaps he is so employed; but he should be aware that neatness, perspicuity, and even elegance, of composition, are compatible with, and essential to, the success of his labours, when he presents those labours to the public. The language of his dissecting room, like his dissecting dress, may be negligent and coarse; but we should be hurt to descry the professor of medicine, anatomy, and surgery, issuing into the streets and public places enveloped in a greasy gown, and an old leathern travelling cap on his head. If the language of this volume is redundant without perspicuity, if familiar without ease, the author has injured medical literature by his example;

"The *better sort* should set before them
 A grace, a manner, a decorum;
 Something that gives their actions light,
 Not only makes them great, but bright."—PRIOR.

Having ventured thus far, *en passant*, on a subject we deem of some importance, especially in this age of invention and coinage, when new terms start up daily, to "fright the language from its propriety," we proceed to the body of the work.

The first chapter consists of "General Observations upon the Structure and Morbid Anatomy of the Alimentary Canal," preliminary to the particular objects of the volume, which are classed under the six following heads.

1. Comprehends an explanation of the morbid effects which have resulted from hurtful substances swallowed by design or accident.

2. Organic affections peculiar to the coats of the alimentary canal.

3. The nature and distressing consequences of the displacement of a part of the alimentary canal.

4. An explanation of the various mal-conformations of the alimentary canal.

5. Description of worms which occasionally infest the alimentary canal.

6. An enumeration of the causes which lead to an enlargement of those neighbouring organs, which, by pressing upon the alimentary canal, prove a mechanical obstruction to the progress of its contents.

Our readers will perceive the rich and interesting harvest which the subject promises, and expectation will not be disappointed.

"The greater part of the diseases of the alimentary canal, included in the above six classes, tend to obstruct the passage of the aliment to a greater or less degree; creating, in some instances, a permanent, in others only a temporary, obstruction.

"The permanent obstruction, by stricture, is of slow growth, but constant in its operation, and becomes greater and greater, either from the gradual increase of the concretion or tumor occasioning it, or from the gradual approximation of the opposite sides of the canal; whereas, the stricture from spasm comes on

suddenly, is generally of short duration, and the spasmodic contraction frequently goes off spontaneously, or after the exhibition of proper remedies.

“ But upon some occasions the spasmodic contraction is not removed during life; and upon dissection we find the muscular coat of an unnatural hardness.

“ There is in some constitutions a remarkable disposition to diseases which obstruct the *alimentary canal*. I have met with several patients who have been so unfortunate as to labour under two very different causes of obstruction at the same time, or in succession.

“ The symptoms, originating from very different causes of obstruction, are in some respects similar; the patient suffers much from a severe tightness, pain, and soreness, in the diseased part.

“ The mucous membrane being much irritated, the mucus, which is secreted in an extraordinary quantity, instead of being a mild fluid, becomes thin, of a light green or yellow colour, and acquires an unnatural acrimony, so as sometimes to excoriate the neighbouring parts; and it is discharged in considerable quantity from the mouth, by hawking, or along with the fæces.

“ Those mucous glands and their ducts, which are situated above the seat of the obstruction, being much irritated, attain an unnatural size, whilst those under it are not at all affected.

“ The above symptoms are occasionally aggravated by catching cold;* and, in these circumstances, and from the irritable nature of the patient's constitution, an unnatural local spasmodic contraction is sometimes excited, which aggravates his sufferings.

* We would be glad to see the popular and vague term, *catching cold*, expelled from works of science. What does it strictly and truly mean? Sometimes it meets us in the form of catarrh, or bronchitis; now it limps in rheumatism, suffocates in asthma, and our Professor employs it to aggravate the symptoms of obstruction in the intestinal canal. In short, it is the scape-goat of all our sins, with respect to the cause of disease. What is the cause of my complaint says the patient? The reply of the nurse, the apothecary, the surgeon, the physician, and the professor, is, you have *caught cold*. Thus have we gone on from age to age, but surely it is now time to question the validity of this catching cold. It may continue to be the shibboleth of old women, but the term should be discarded by men of sense and science.

“The constitution is at first but little affected, but, in consequence of the continuance of the obstructing cause, the digestive powers are much impaired. The patient loaths his food; what is taken becomes acid; he loses his spirits; and is occasionally very costive; but at other times much weakened by a bilious diarrhœa. He becomes weak and emaciated, and has a quick pulse: he suffers after a time very great pain, owing to the distention by air.

“The *air* accumulated in the stomach and intestines, sometimes distends these organs to such an uncommon size, that the convolutions of the intestines may be distinctly felt through the parietes of the abdomen.

“I have seen the stomach and intestines distended to two or three times their natural size, and sometimes even ruptured by unnatural distention.

“It has been matter of dispute among physiologists, from what source the air is derived.

“It is not compatible with the object and limits of this volume, to enter at large into this question, which has afforded matter for so much controversy. I shall therefore only observe, that, as far as I can judge, a part of it is swallowed, a part is formed by secretion, and a part is generated by fermentation.

“As we sometimes meet with cases, where the distention, although so considerable as to occasion great pain and uneasiness, yet has gone off gradually, and without the discharge of air by the mouth or anus, it is probable that part of the accumulated air has been taken up by the absorbent vessels.

“From the abdomen being tense like a drum, where the stomach and intestines are distended by air, the name *tympanites* has been employed by nosologists, to express this morbid state.

“As the air sometimes escapes from the intestines into the general cavity of the abdomen, in consequence of wounds, ulceration, and other diseases, nosologists also describe the *tympanites abdominalis*.

“It is of some moment to distinguish the one species of tympany from the other, the former being a much less dangerous affection than the latter.

“The abdominal tympany comes on suddenly, the belly is

uniformly distended in whatever posture the patient is, and also smooth; the patient is not sensible of wind moving within his bowels, nor does he hear the sound of it; and he is not relieved by passing wind, nor is the distention of the belly diminished by a purgative.

“The intestinal tympany, on the other hand, comes on very gradually, the turns of the intestines may be traced by a careful examination; and the sound of the air, passing from the contracted to the dilated position, may be perceived.

“Besides, the patient is sensible of air moving from one place to another; and, whilst the air passes from one turn of the intestine to another, he suffers pain, the intestines being generally spasmodically straightened. The patient also discharges an unusual quantity of air, upwards and downwards, by which he is much relieved.

“It may not be unnecessary to add, that the intestinal tympany has been mistaken for a dropsy of the belly; and, on the other hand, when a small quantity of water is contained within the cavity of the belly, and the intestines have at the same time been filled by air, the distended intestines float upon the water, and render it difficult, unless the patient be examined in different attitudes, to discover the water within the belly.

“An acute inflammation is sometimes the sequel of the immoderate distention of the stomach and intestines; it is rapidly communicated from one part of the abdomen to another, and very frequently proves fatal in a short time, by terminating in gangrene. But, in other cases, in the vicinity of the obstruction, we find the coats of that portion of the alimentary canal, immediately above the distended part, much thickened, in the same manner as the muscular structure of the heart and of the bladder of urine becomes much thickened, where there is an extraordinary impediment to the exit of the blood or urine.

“In such cases, the muscular fibres become thicker, redder, and stronger, to overcome the unnatural resistance.

“In some cases, the part immediately above the obstruction is extended into a pouch. I have seen the gullet, when an extraneous body has been lodged in it for a considerable time, or when it has been obstructed by any other cause, dilated into a large pouch, which still further obstructed the swallowing.

and also the breathing; and, when that pouch is placed near to the termination of the gullet in the stomach, it may press so much upon the heart and lungs as to derange the functions of these organs.

“In a similar manner, the stomach, when the pylorus has been obstructed, sometimes becomes so prodigiously enlarged, as to reach the pelvis; and they are much dilated, from obstruction in any part of the intestinal canal. I have seen the *intestinum rectum*, in consequence of obstruction, so dilated, as to be capable of containing a child's head.

“The veins, in the vicinity of the obstruction, sometimes become enlarged, or varicose, and add materially to the bulk of the tumour; so that, when the rectum has been extended in consequence of an unnatural obstruction, it proves an impediment to the free discharge of urine, or the contents of the uterus.

“But the part beneath the seat of the obstruction undergoes a very opposite change; it is always somewhat contracted in its diameter.

“The unnatural pouch, created by the obstruction in the alimentary canal, generally adheres to the neighbouring parts. The distention continuing, some part of the pouch becomes thinner than the rest; the absorbent vessels are roused to act more powerfully than usual, by the stimulus of the unnatural distention; the sac becomes thinner and thinner, and at length bursts, or the unnatural sac is destroyed by ulceration; thus a communication is formed between the neighbouring organs, as between the gullet and windpipe, between the stomach and colon, or between the contiguous turns of the intestinal canal. Through this unnatural communication, the contents of one part may pass into another, which proves, on some occasions, the cause of instant death, as when the contents of the gullet escape into the windpipe; but, in other instances, life is thus prolonged, as when the pylorus is obstructed, and when the contents of the stomach pass directly into the colon.”

Having made these remarks, which are applicable to the various causes of obstruction in the *alimentary canal*, the author proceeds to describe, in the second chapter, the organic dis-

eases of the *gullet, stomach, and intestines*. This chapter is divided into six sections, the first of which treats "*of Extraneous Bodies lodged within different Parts of the Alimentary Canal, and of their Effects.*"

In this section are collected many extraordinary instances of substances swallowed, with the effects produced, and dissections of patients who died from this cause. The two following show, very forcibly, how far the alimentary canal can accommodate itself to such intrusions.

"A child, two years of age, swallowed a glass ball, three inches in circumference; it passed through the canal in two days, and did not produce a bad symptom. A female child, three years old, swallowed a pair of compasses, two inches and a half long, and which passed through the alimentary canal in three days, without creating, at the time, or afterwards, a bad symptom."

Section 2.—"*Of Obstructions in the Alimentary Canal, occasioned by Alvine Concretions.*"

In this section is given a more extensive history of human alvine concretions, than is elsewhere to be met with; the materials for which have been principally furnished from the extensive collection of these substances made by Professor Monro, senior: four plates are annexed, which considerably elucidate the subject.

The symptoms indicating the existence of these concretions are stated to be irritation, functions of the stomach and intestines impaired and altered, much griping and sometimes acute pain.

"The pain in the bowels, in some cases fixed to one part, is much more severe upon one occasion than another, especially after taking acids, or food of difficult digestion, and is frequently attended by nausea and vomiting.

"Some patients are much constipated for two or three days, and yet have a constant inclination to go to stool. Others have watery stools, and discharge, along with these, a quantity of viscid ropy mucus, or blood; after which they are much relieved.

"Some patients discharge their stools involuntarily.

“Upon relaxing the parietes of the abdomen, a very hard, painful, globular, tumour, may generally be felt, most frequently in the course of the large intestines. It can seldom be made to change its place within the intestine; but often appears to do so in consequence of the change of place of the intestine which contains it. Hence the change appears greatest when the concretion is within the small intestines or arch of the colon, which, from the length of the mesentery or mesocolon, are very moveable.

“The digestive powers being much impaired, the patient becomes very weak and much emaciated; and, from the continuance of the disease, is reduced to a skeleton.

“The pulse, in the earlier stages of the disease, is but little affected.

“Upon the alvine concretion changing its place, and passing down into the sigmoid flexure of the colon, or into the rectum, it creates excruciating torture in the region of the pelvis, and the bowels become much distended, from the passage being suddenly interrupted, and the patient apprehends instant death.”

Several cases are subjoined illustrative of the phænomena, management, and termination, of this species of disease of the intestinal canal; and, from his view of the subject, the Professor thinks he has established the following propositions:

“1. That the greater number of *Alvine Concretions* are made up of fibres, which are intimately matted together, and which probably have been attracted by a central nucleus.

“2. That A. C. occasion a derangement of the functions of the alimentary canal, and create griping, obstinate, and long-continued, colicky pains, which are generally limited to that part of the intestinal canal which contains the concretion, and which are occasionally more severe upon the patient's taking acids, or food of difficult digestion.

“3. That A. C. may generally be felt within the intestines, and that when two or more of these are lodged within the intestines, these may be made to strike against each other.

“4. That A. C. frequently change their situation, and pass down into the rectum, which is thereby much extended, and, when so situated, occasion acute pain and sense of weight in the back part of the pelvis, which is attended by a constant de-

sire to go to stool, which the patient cannot gratify; and they may, by a finger, or by an instrument, introduced into the rectum, be felt within it.

"5. That A. C., formed within the human alimentary canal, are, in some cases, discharged by vomiting, or along with the fæces.

"6. That an A. C., after a certain time, cannot be moved from one portion of the alimentary canal to another, owing to its increase in bulk, to the expansion of the coats, in that part which contains the concretion, into a *sac*, and to the unnatural constriction immediately below the seat of the alvine concretion.

"7. That A. C. must prove a mechanical obstruction to the passage of the aliment through the intestines; and, if proper means be not taken to remove the cause of the obstruction, inflammation follows, which proves fatal.

"8. From the chemical analysis of the concretions, it is evident that alvine concretions are of a very peculiar nature, and different from all vegetable and animal productions; and that solvents, sufficiently powerful to act upon those concretions within the intestines, cannot be employed, with impunity, to give the least hope of decomposing those substances within the body, and evacuating them in the ordinary way.

9. "That, in the earlier stages of the disease, while the concretion may be moved from one part of the intestines to another, all that can be done, is to operate on the bowels, partly through the medium of mechanical action, and partly by lubricating the alimentary canal by the exhibition of proper medicines, in order that the concretion may be discharged along with the fæces, or may descend into the rectum, from which it may be artificially extracted.

"10. That after the disease has been of long standing, and when a sac has been formed, which retains the concretion in a certain place, it cannot be removed, should it be lodged within the colon, but by an incision."

Dr. Monro, sen. had suggested that the incision mentioned in proposition 10, might, under certain circumstances, be employed with a fair chance of saving life; and a case is given in this volume (page 58), in which, it is probable, such an operation would have been successful.

Section 3.—“*Of Calculi of the Tonsils.*”

Of this very uncommon disease two cases are inserted. Of the calculi, three in number, in these cases, a description is given by Professor Jameson, and a chemical analysis by Dr. Thomson.

Section 4.—Treats of the “*Effects of Arsenic.*”

In this section are contained several experiments made on animals with arsenic in its metallic state, and with artificial sulphurets of this substance. From these experiments it appeared “that the metallic arsenic might be taken by dogs with impunity, to the extent of several grains.” It produced, however, in these cases, some disturbance in the first passages, and its exhibition was followed by a considerable flow of urine.

Section 5.—“*Of the Effects of Opium.*”

It might be expected that the medium through which opium acts on the system would not now be doubtful; the contrary, however, is the fact. The late Dr. Whytt asserted, that this substance affected the system by the medium of the nerves only. That experimental physiologist Fontana, was equally positive that the blood was the medium. “My father’s numerous experiments,” says our author, “led him to a different conclusion. He supposes, that opium not only affects the nerves, to which it is primarily applied, but is also absorbed; and, being then mixed with the blood, proves fatal, by its sedative powers upon the nerves of the heart and blood-vessels, and the whole nervous system.”

When opium has been swallowed in a deleterious quantity, two distinct sets of symptoms arise. These are “vertigo, torpor, slow and full pulse; breathing, at first quick, difficult, and stertorous, and it gradually becomes slower, so that there is a distinct intermission between the inspirations. The pulse gradually becomes more feeble and slower, as the breathing becomes slower. The patient falls into a profound sleep, from which he does not awake, and dies apoplectic, and sometimes is much convulsed. In other cases, vomiting takes place, and the patient becomes afterwards paralytic.”

The great object is to remove the poison from the stomach,

and this is to be done by emetics. Of those, Professor *Monro* recommends, in preference to all others, sulphate of zinc in solution, in doses of \mathfrak{J} j. to \mathfrak{Z} ss. The greater part of the section is employed in describing an instrument for conveying fluids into the stomach.

Section 6.—“*Of the Effects of concentrated Mineral Acids.*”

Of this section, of half a page, it is only necessary to give the title.

CHAPTER III. CLASS 2.

“*Of the Organic Diseases of the Coats of the Intestinal Canal.*”

This chapter is of great importance, as it applies to some of the most formidable and fatal diseases incident to the animal frame. In the distribution of the subject of this chapter, Dr. *Monro* adopts the following arrangement: 1. Organic derangements of the *villous coat* of the pharynx, gullet, stomach, and intestines. 2. Of the *cellular coat*. 3. Of the mucous coat. 4. Of the peritonæal coat.

The organic morbid alterations of the *villous coat* of the pharynx, gullet, stomach, and intestines, are first explained. (The investigation is confined to that part of the alimentary canal which is included between the pharynx and rectum.) These organic derangements are treated of under the heads inflammation, thickening, ulceration and gangrene, ulceration and erosion from dysentery, milt-like tumor, polypi, sarcomata, watery tumors, fungous tumors, hæmorrhoids, varicose tumors, strictures, where the other coats are not affected, projecting ring of Dr. *Baillie*, aphthæ, small-pox pustule, deposition of cartilage, formation of bone.

The second section of this chapter (the first section contains only a synopsis of its arrangement) treats of inflammation of the villous coat. There are three facts in this section, which, as having come directly under the author's observance, may not be deemed uninteresting to our readers. It has very generally been understood, that redness and turgescence of the neighbouring arteries are essential to inflammation of the intestines. Dr. *Monro* has seen, however, “the bowels of patients who died with all the symptoms of inflammation, of a sea-green colour; which colour could not be imputed to putrefaction, as the body was (bodies were) examined a short time after

death." In three cases, the author saw the internal membrane of the pharynx thrown into a state of high inflammation, in consequence of the bite of a mad dog. "*The colour of this inflammation was very peculiar; it was not a brilliant red, such as that produced by vermilion, but the purple red, such as carmine or lake gives.*" In the body of a woman who died of diabetes, he "observed an appearance in the intestines similar to that occasioned by inflammation. Upon a more accurate examination, the red colour was found owing to a *red jelly* effused between the peritonæal and muscular coats of the intestines." In this inflammation of the villous coat, the mucus, instead of being a mild, transparent, viscid fluid, is rendered opaque, white, sometimes ropy, and even frothy.

Section 3.—"*Thickening of the Villous Coat.*"

The villous coat, from repeated inflammation, remains in a thickened, spongy, and irritable state; and the common occurrence of effusion of coagulable lymph adds very much to this thickening. The general description is illustrated by cases, and the fact rendered more obvious in Plate XIV. In the Museum of Edinburgh there are several specimens of coagulable lymph being thrown into the cavity of the intestine in such quantity as to take the form of the cavity, and, being discharged per anum, were deemed to be worms of a very unusual kind and size.

Section 4.—"*Ulceration and Erosion of the Villous Coat.*"

This state of disease is often the occasion of establishing preternatural communications between neighbouring parts, from the adhesion preceding the ulcerative process. "The symptoms which denote ulceration of the villous coat, are, slight hot and cold fits; hectic flushing of the face; pain in the part affected, becoming less acute, and *detumescence* of the belly; pulse fuller and slower, often irregular." In the progress of the disease, "the patient becomes very thin, and very weak, and also very costive, hot, thirsty, and feverish, and in this state languishes for a few months; at length he is affected by stupor and delirium, and dies completely exhausted."

Section 5.—"*Gangrene.*"

"Inflammation of the villous coat rarely terminates in gan-

grene." In this section there are many practical remarks, for which we must refer our readers to the work itself. It also contains a detail of the symptoms of hydrophobia, and a minute history of a case; but, why inserted here, we do not fully see; because, in the fauces, larynx, pharynx, œsophagus, stomach, and the whole of the abdominal viscera, there was not the slightest morbid appearance. In a distant part of the volume we find the "symptoms of mortification of the villous coat." P. 151.

Section 6.—"*Of Inflammation, Ulceration, and Erosion, of the Villous Coat from Dysentery.*"

The history and symptoms of dysentery are here detailed from a manuscript of the author's uncle, Dr. Donald Monro. The concluding part of the section we would gladly insert, as containing some general facts respecting the habits of the mucous membrane; but, when we look to the number of pages yet to go over, we are compelled to forbear.

Section 7.—"*Of the Milt-like Tumor of the Mucous Membrane.*"

This tumor, which our author considers as having entirely escaped the attention of pathologists, he describes as having some analogy to the *anomalous tumor* of his grandfather, to the spongoid inflammation of Burns, and the fungous hæmatodes of Hay; and also to that organic disease of the testes, described by Baillie, under the head of pulpy testicle.

"I have called it, says Dr. M——, milt-like tumor, as it resembles in colour and consistence the milt of many fishes; and have added the words mucous membranes, because it grows only from membranes of that description.

"This species of tumor generally attains so considerable bulk, as to fill and even to distend to an unnatural bulk, the bowel within which it is contained, as I have seen in the case of the bladder of urine; but, in other cases, this tumor grows from a part only of the mucous membranes, lining the bowel.

"This milt-like tumor, in many respects, resembles the milt of fishes; it is of a pale red colour, and it is also nearly of the same consistence, but rather softer, and has an irregular surface, and is covered by a thin membrane, upon which there are a number of vessels filled by red blood.

“ This species of tumor very readily falls to pieces, and mixes in part with water, forming a turbid mixture; and is somewhat hardened by being put into strong spirits. It adheres but slightly to the organ from which it grows, by a number of small processes, which insinuate themselves into the villous coat, which has attained an unnatural thickness; and, when the tumor has been detached, the villous coat of the diseased bowel assumes somewhat of a honeycomb appearance, and it is besmeared by several drops of blood, which are derived from the vessels which extended to the tumor being torn.

“ The bowel from which such a tumor grows externally, betrays marks of inflammation; there is evidently an unnatural determination of blood to the seat of the disease, the blood-vessels upon the peritonæal coat being not only larger, but also more numerous than in the healthy state.

“ There is another peculiarity in the disease, viz. a very remarkable offensive fœtor; and the organ, containing such a tumor, is as much discoloured, and emits as fœtid a smell, as the bowel which has been exposed to the air for several days.”

An endeavour is made to give the characteristic marks of this tumor which distinguish it from the tumor to which it was compared in the preceding part of the section, accompanied with a coloured plate, (No. V.) drawn from a case here related by Mr. C. Anderson, of Leith.

Section 8.—“ *Of Polypi.*”

In this section the varieties of polypus are described, under those of the pharynx, the *gullet*, and the stomach, with an annexed plate, (No. VI.) taken from the disease of a patient, whose case is given.

Section 9.—“ *Steatomatous Tumors.*”

The author has not seen an example of this organic disease of the villous coat of the alimentary canal, of course nothing satisfactory is said on it.

Section 10.—“ *Fungus of the Villous Coat of the Alimentary Canal, and of Fungous Tumors connected with that Membrane.*”

This disease is not of infrequent occurrence; the tumors

are generally of a small size, of a very soft consistence, bleed when torn, and are mostly composed of several small lobules. The accompanying symptoms depend much on the situation of the disease. When in the œsophagus, difficult deglutition; and when in the stomach, indigestion, nausea, and rejection of blood by vomiting; when in the intestines, pain, purging, and discharge of blood by the fæces. An etching, (No. VII.) represents a cluster of fungous tumors, which stretched across the colon, and which, by intercepting the passage, had occasioned considerable distention.

Sections 10 and 11, treat very concisely “*of Hæmorrhoids, and Varicose Tumors.*”

From these sections we can only notice that sometimes varicose veins of the stomach burst, and large quantities of blood are lost; and the historical fact of Copernicus having died of an hæmorrhage from an hæmorrhoidal varix.

Section 13.—“*Stricture occasioned by a transverse Fold of the Villous Coat of the Alimentary Canal.*”

In every case of stricture of the œsophagus, stomach, or intestines, which the author has seen, all the coats of the part affected have been constricted, “so that there was an appearance as if a cord had been drawn very tightly around the diseased part of the alimentary canal.” Baillie and Home are particularly referred to, but why are not the later and interesting publications of Copeland and White noticed?

Section 14.—“*Of Aphthæ,*” and 15, “*Small-pox Pustules within the Alimentary Canal,*” afford no remark that will be at all interesting, except that the pustules of small-pox in the intestines is “an extremely rare” occurrence.

Section 16.—“*Deposition of Cartilage and Bone upon the Villous Coat of the Alimentary Canal.*”

The parts of the canal most subjected to this disease, are the œsophagus, colon, and rectum. When the cartilaginous stricture happens to the rectum, the symptoms are described to be,

First, “a slight difficulty in making water; this is followed by nausea, impaired digestion, colicky pains, tenesmus, and

habitual costiveness. The fæces have not their usual size and shape, but resemble small earth-worms, and are expelled only after a considerable effort; and, when the patient is very costive, blood is sometimes discharged with the excrement; and generally a quantity of fœtid mucus, ichorous, or purulent matter. When the disease has been of some duration, solid fæces cannot pass; and the contents of the intestines are discharged in a liquid form, and even these are passed only after a considerable effort."

We now come to the second general division of this chapter, "*Organic Derangements of the Cellular Coat of the Alimentary Canal*," to which, with an unfortunate anomaly as to the construction of the volume, is continued the term section. According to the synoptic view (p. 111) it contains three subdivisions: phlegmon and its consequences; albuminous tumors; and diseases which originate in the other coverings of the intestines. As we have professed to follow our author precisely, we must, with him, call this second general division section 17. This section contains general observations on inflammation of the cellular coat, and its consequences, abscess, &c. Section 18, is on a subject of considerable novelty and interest, "*the Deposition of albuminous Matter in the cellular Coat of the Alimentary Canal*."

"This organic derangement is of a very peculiar nature, and very generally affects at the same time different bowels of the abdomen and pelvis, and also the lymphatic glands in the vicinity.

"In the earlier part of the disease, we observe small hard tumors, about the size of a pea, in the cellular substance, which grow inwardly, and which push before them the villous coat.

In the more advanced stages, the diseased bowel attains an unnatural hardness and size, and its coats are prodigiously thickened in some places. Tumors of a pyramidal figure grow inwards from the thickened parietes, by which the diameter of the affected part is much lessened. Upon making a section of the coats, we observe the peritonæal coat somewhat harder, whiter, and thicker, than common, but no appearance of the

cellular and muscular coats, for their place is occupied by the albuminous substance."

The liver, testes, uterus, and lymphatic glands, are all subject to this disease, and have their texture and appearance exceedingly changed by it; as it appears in the liver, it is here the subject of a particular description.

The third subdivision has no more than its title.

The third general division, "*Organic derangements of the muscular Coat of the Alimentary Canal*," making the 19th section, contains inflammation and its consequences, spasm, and palsy. The contraction of the middle of the stomach, as stated by Mr. Home, is admitted to be nearly correct; and, in the part appropriated to spasmodic contractions of the intestines, the species or varieties of cholic, in nosologists, are slightly treated of. From this part we extract the following passage, on the possibility of ascertaining the seat of the contraction by the symptoms.

"Pain in the navel has been supposed to be characteristic of contraction in the *jejunum or ilium*; nervous oppression, torpor, inclination to sleep, when the *stomach is empty*; occasional distention of the abdomen, pain in the right side, which is occasionally very great, and which stretches to the back, and occasionally to the top, of the right shoulder, and which changes its place upon the expulsion of air, slight yellowness of the eyes and countenance, with an irregular and soft pulse, that of the *duodenum*; and pain in the right side, stretching toward the region of the liver, that of the *caput cæcum coli*. Acute twisting pain about the navel, which is not increased on pressure, the dragging inwards of the parietes of the abdomen, which, when pressed, feel hard and knotty, tenesmus, and obstinate costiveness, are pathognomonic symptoms of the painter's cholic."

The muscles of the palsied extremities, consequent on this species of cholic, not only lose their natural size, but have their structure converted into a suety substance; as has also happened in rachitis, in scrofula, and in that disease called osteosarcoma.

The 20th section, still subjected to the anomaly before noticed, constitutes the fourth general division of this chapter,

and comprehends the "*Organic Derangements of the Peritoneal Coat.*" The subdivision of this treats of inflammation—Section 21, small tumors growing from the peritoneal coat—Section 22, ossification of the peritonæum—Section 23, hydatids.

The last of these subdivisions, under the denomination of section 23, treats very fully on the obscure form of animal life in the hydatid; and from which the following corollaries are deduced:

"1st. That hydatids are not peculiar to any one part of the human body, and (but) are most commonly connected with the investing membranes of the liver, ovaria, or kidney.

"2d. That there is no resemblance between the hydatids which are peculiar to quadrupeds, and those of the human body, as is obvious, by comparing the preceding description of the hydatid of the human body, with those of the hydatids of quadrupeds, which have been published by Hartmanus, Tyson, Pallas, Schröder, Fontana, and E. Horne.

"3d. That there is every reason to conclude that hydatids are animals.

"4th. That observation and experiment have not yet determined in what manner hydatids are generated, or deposited, within certain bowels.

"5th. That, as the smaller hydatids adhere to the inner surface of the larger, the larger hydatids may be called pregnant; or that these animals are multiplied, like some vegetables, by the adhesion of the smaller hydatids to the coats of the larger hydatids.

"6th. That the coats of the bowels containing the hydatids are much more frequently destroyed, than when water only has been collected within them; hence the hydatids escape from their original situation, and sometimes find their way by unnatural passages into the intestines, urinary or biliary canals, windpipe, &c.

"7th. That many patients recover upon the discharge of the hydatids.

"8th. That hydatids may, even when adhering to one of the bowels of the abdomen, be removed by incision, provided there exists an adhesion between that viscus and the parietes of the abdomen."

The fifth general division, called section 24, treats of "*Organic Derangements of all the Coats of the Alimentary Canal.*"

Under this division are investigated the various degrees and situations of stricture of the alimentary canal, scrofula of the intestines, coats of the alimentary canal reduced to a pulpy state, induration of the coats of the intestines, dilatation and rupture of a part of the alimentary canal, organic diseases of the mucous glands of the alimentary canal, scirrhus and cancer of the gullet, stomach, pylorus, and intestines, scirrhus rectum, enlargement of the mucous glands of the alimentary canal.

Three plates accompany this part—No. 8, representing a fatal stricture of the œsophagus; No. 9, a cancer of the œsophagus; and No. 10, stricture occasioned by cancerous tumors at the cardia, and cancer of the stomach.

The third CHAPTER treats of those obstructions which "*originate from a Displacement of a Portion of the Alimentary Canal.*" These causes of obstruction are *Intus-susceptio*, *Procidentia Ani*, and *Hernia*.

Section 1.—"*Intus-susceptio.*"

This derangement occurs much more frequently in infancy than in advanced life. It is of "two very distinct kinds, that which is unattended by inflammation, and that attended by acute inflammation and its consequences. The former, which occurs generally during infancy, in most cases does not merit the name of a disease, as it does not derange the functions of the alimentary canal; whereas the latter, which may be ranked among the diseases of manhood and old age, is one of the most acute and fatal disorders incident to humanity."

The phenomena that distinguish the intus-susceptio, accompanied with acute symptoms, from inflammation of the intestines excited by other causes, are stated to be,

"The sudden appearance of the symptoms after violent straining at stool, the impossibility of throwing up by the anus as much liquid as in a state of health, together with the sudden appearance of a hard tumor on the left side of the abdomen, and which is painful on pressure."

The progress of the disease is well marked in a case from Professor *Monro, sen.* with a plate, No. 21.

Connected with this derangement of the intestinal canal, is the discharge of a portion of intestine by stool. Alarming as this appears, it is not always dangerous. An instance is here given of fifteen inches of the ilium being brought away by stool, and the patient having good health for many years after.

Section 2, "*Procidentia Ani*" is so connected with section 1, that it is barely mentioned here.

Section 3, "*of Hernia*," is important and extensive, occupying the volume from page 363 to 542; and is illustrated by several plates.

To give such an analysis of this section as would be at all satisfactory to our readers, would occupy more space than can be allowed to it; we must therefore refer to the work itself, and only observe, that the author has brought together much curious matter both anatomical and chirurgical, on every species and variety of the disease.

CHAPTER IV. "*Of Mal-formations of the lower Part of the Alimentary Canal*," is confined to a description of mal-conformations of the rectum, under eight varieties.

1st, And most common, is that in which the rectum is covered (when it should terminate in the anus) by the common teguments, or by a membrane of considerable thickness.

2d, When the membrane which obstructs the rectum is internal.

3d, Unnatural contraction of the rectum.

4th, Where the rectum terminates in the bladder of urine, urethra, vagina, or womb.

5th, The rectum terminating in the vagina, through which the fæces are discharged.

6th, Where the rectum is sometimes entirely *awanting* (wanting.)

7th, Where the rectum opens through the os sacrum.

8th, Where the rectum has been continued through the vagina, and has terminated external to the vulva.

CHAPTER V. "*On the Worms which infest the human Alimentary Canal*," gives a short detail of the history and anatomical structure of the *Tenia solium*, *T. dentata*, *T. lata*; the *Ascaris vermicularis*, *A. lumbricoides*; and the *Trichuris hominis*.

Of the last, the *Trichuris hominis*, as being a more rare species than the former, we shall insert the professor's description.

"The body is about an inch long, and it has a filiform tail, about an inch and a half in length.

"Different authors vary in their opinions respecting the anatomy of this worm. According to some, the animal has a proboscis, which it can eject at pleasure; according to Goeze, that is the penis of the animal.

"The stomach and intestines form a long canal, which proceeds from the head to the extremity of the worm, and is largest at the beginning; is much smaller at the tail of the animal.

"The ovarium, which frequently contains ovula, and a limpid fluid, is a convoluted canal, and similar to that of the female *ascaris vermicularis*."

We had been made to understand, that after chapter five there was to be a sixth, to consist "of an enumeration of the causes which lead to an enlargement of those neighbouring organs, which, by pressing upon the alimentary canal, prove a mechanical obstruction to the progress of its contents." But we have not found it in its promised place.

Upon the importance of the subject of this volume there will be but one opinion—upon the quality of the materials with which it is formed, there will necessarily exist diversity of estimation—upon the style in which it is written, and upon the employment of low and popular terms in the place of those consecrated to science, we have been free in our animadversions. But, if we should be thought to have fallen into any semblance of severity, we deprecate the charge. Our duty to the profession, and to ourselves, required that we should speak out; and this we have done in the spirit of perfect charity with Professor Monro. When we see men in high stations negligent of appearances in their public acts, we feel for the credit of themselves and of the profession to which they belong; and we tremble for the effect of precedent.

ORIGINAL PAPERS.

Remarks upon the Hydrophobia.

In a letter to Dr. David Hosack, of New-York, from BENJAMIN RUSH, M. D. Professor of Medicine in the University of Pennsylvania.

DEAR SIR,

In the fourth volume of my Medical Inquiries and Observations I have endeavoured to prove, that the disease produced by the bite of rabid animals is a state of fever, seated chiefly in the blood-vessels, but extended in a certain degree, in common with several other states of fever, to the nervous and muscular systems. In the course of the last winter I received a pamphlet from Dr. Schoolbred, a British physician in Calcutta, containing an account of four cases of hydrophobia, the histories and cures of which favour the opinion I have published of the nature of that disease, and of the remedies that are calculated to cure it. The first of these cures was performed by Mr. F. Tymon, the second by Dr. Schoolbred, and the other two, by Dr. Alexander Berry.

The symptoms of the disease as described by the two former gentlemen, strongly marked its febrile nature. They were chilliness, a warm skin, a pulse beating from 104 to 110 strokes in a minute, eyes and face suffused with blood, head-ach, and occasionally, delirium.

The remedies employed by them were,

1. Bleeding to fainting, or until the pulse was scarcely perceptible. The effects of this remedy were, an ability to swallow liquids; bilious discharges from the bowels; a reduction of the frequency of the pulse; a sense of heat, and a desire to be fanned; and lastly sleep, a relief seldom or never experienced in this disease. The blood drawn in the case described by Dr. Schoolbred, was of a scarlet colour, and such as marks the second grade of malignant fevers.

2. Immediately after bleeding, calomel and opium were given in large quantities; the latter in tincture by way of clys-

ter, and by the mouth, in the form of pills. A blister was applied to the forehead in one of the cases with advantage.

The two cases of cures performed by Dr. Berry were of a milder nature. They yielded to purges, injections, mercury, and blisters, without the aid of blood-letting. I know it is common, not to admit any case of disease, from the bite of a rabid animal, to be hydrophobia, unless all the symptoms recorded in books, attend it. We do not reason in this manner in other febrile diseases. We admit of different degrees of violence and danger in the plague, in the bilious fever, and in the small pox. Why should we not admit them in the fever which has received the name of Hydrophobia?

Upon the two cures performed by Mr. Tymon and Dr. Schoolbred, I shall now make a few remarks.

Pathologists have described what they call a soap bubble pulse, that is, a pulse possessing a transient vigor, and such as seldom requires much bleeding to reduce it. There is in like manner a soap bubble state of fever, apparently violent in its first stage, but which soon passes into the prostrate, typhus, or gangrenous states of fever. The bilious fever in the southern states, we are told, frequently exhibits this transition from an active, to a feeble state of the arterial system. This soap bubble form of disease appears likewise in madness when it occurs in hard drinkers. After one or two bleedings, which are called for by the pulse, the system sinks into a prostrate state, and unless it be restored by prompt and liberal doses of opium, volatile alkali, and in some cases by ardent spirits, the disease sometimes terminates in death. Now the hydrophobia appears to be a fever of this kind. No sooner is the soap bubble form of the disease reduced by bleeding, than the system sinks as it does after bleeding for drunken madness, and calls for the immediate exhibition of all the remedies commonly employed in the prostrate, typhus, and gangrenous states of fever. The loss of blood in Dr. Schoolbred's patient was but forty ounces,—in Mr. Tymon's, a less quantity. But there may be cases in which the disease may come on with such symptoms of prostration, as to forbid bleeding altogether, and to require the immediate exhibition of the most cordial, and stimulating remedies. Again, there may be cases, that will yield to deple-

tion by purging and sweating only, and in which bleeding may be hurtful. There may be cases in which bleeding may be forbidden in the beginning, and called for in the close of the disease; and lastly, there may be cases in which the symptoms may require the loss of the same quantity of blood that is required to cure an inflammatory pleurisy or yellow fever. Exactly the same variety in the symptoms, and in the order of their appearance, also in the indications of cure, occur in fevers from nearly all their causes.—But why have I supposed such cases of Hydrophobia to be possible? They are to be met with in books, and it is only where the remedies have been accurately and promptly accommodated to the state of the system in each of them, that a cure either by accident, or design, has ever been performed of that disease.*

In favour of the practice I have recommended for the cure of hydrophobia, let us recollect the different issue of the treatment of the small pox and gout since they have been brought under the dominion of the unity of fever, compared with their issue while they were considered as specific diseases. Ages passed away in fruitless attempts to discover remedies that should destroy by mixture, or expel from the system, the poison of the small pox. It was by boldly renouncing them all, and treating that disease as a state of fever, by bleeding and cool air, or by cordial remedies according to the state of the system, that Dr. Sydenham obtained a partial victory over it. Paroxysms of the gout have in like manner been relieved and cured by rejecting the use of remedies which have been supposed to destroy a specific acrimony, or a specific morbid action, and by exhibiting the common remedies for fever, suited to its different grades and seats. To expect a cure for hydro-

* Mr. Nicholas Nancrede, student of medicine in our university, has lately favoured the author with a sight of a copy of a dissection of a patient that died of hydrophobia in Paris, in whom marks of considerable inflammation were discovered in the upper part of the medulla spinalis. It is possible disease in that part may be the cause of the difficulty in swallowing liquids, and of the spasmodic affection of the larynx. The above dissection suggests the propriety of drawing blood by cups from the upper part of the spine, or of applying stimulating liniments, blisters, or caustics to it, according to the state of the system.

phobia by any other means, is to renounce not only reason, but all experience in medicine.

I shall conclude my letter by mentioning, that several cases have lately occurred under my notice, or within my knowledge, in which there was good reason to believe, from circumstances, that the excision of the part many days, and in one instance six weeks after the wound was inflicted by a rabid animal, prevented the disease. When patients object to this radical preventive, or to the application of a caustic, perhaps moderate depletion by bleeding, purging and sweating medicines, and low diet, would have the same effect in mitigating the disease, or preventing it altogether, that they have in lessening the violence of the small pox, or preventing an attack of the yellow fever. Cases of the success of the first three of those remedies in seven persons bitten by a mad dog, have been transmitted to us from the high and respectable authority of Dr. Hillary, in his *Observations upon the Diseases of Barbadoes*.*

From, Dear Sir,
yours truly, and very respectfully,
BENJAMIN RUSH.

Philadelphia, March 15, 1813.

Harrisonburg, (Rockingham, Va.) 25th January, 1813.

To the Editors of the Eclectic Repertory.

GENTLEMEN,

I transmit the following case for insertion in the *Eclectic Repertory*, if it shall be deemed worthy a place in that excellent periodical work.

I am, yours respectfully,
PEACHEY HARRISON.

James Gordon, aged about seventeen years, was taken on Monday the 27th July, 1812, with a difficulty of swallowing. This sensation seemed, at first, to be felt low down the œso-

* Those persons took at the same time musk, cinnabar and camphor, but from their inefficacy in similar cases when used alone, no benefit can be ascribed to them.

phagus, near the stomach, and gradually to arise to the pharynx. On Tuesday the difficulty of deglutition was increased; had pain in his back, some chilliness and some constriction about the breast: began also to feel a degree of immobility of the lower extremities, which were somewhat cold. Thursday, being still worse, his father applied to me, and gave me in substance the history of the case, above stated; and further added, that he was inclined to think, that the symptoms had been brought on by an excessive use of brimstone in curing the itch. Upon inquiry I found, that the sulphur had been used in April, and that the young man had not been well since, without however having any very distinct cause of complaint. Upon the whole, I supposed his symptoms to be nervous, and that no very great importance was to be attached to them. I sent him some antispasmodic and anodyne medicine, his stomach and bowels, as his father informed me, having been well cleansed the day before, with a dose of the May apple root.

On Saturday the first of August, I saw him; and found his deglutition difficult, and his lower extremities very nearly immoveable. I also discovered a paralytic faltering in his tongue. He referred the obstruction in swallowing, to a point a little above the sternum. Upon examining the fauces, but very slight marks of inflammation were discoverable. In fact he had no pain in attempting to swallow; but still he found it very difficult to do it. There was no soreness or swelling any where about his neck or breast. His pulse varied very little from the natural action; had no feverish heat on his skin; but it exhibited a slight degree of lividness. I candidly confess that I was very much at a loss to account for the symptoms, or what course to pursue in the treatment. That he had paralytic symptoms was obvious, but what was the nature of the affection of his throat? Was it the globus hystericus? What had induced the paralysis? It did not seem to proceed from the brain, for the intellectual functions were quite regular, and continued so till the last moment of life, although the paralysis became universal and almost entire. As to the treatment, I detracted twelve ounces of blood from his arm; gave a cathartic; directed a general warm bath, and, after the operation of the purgative, a continuance of the anodyne medicine.

August 4th, again saw him, and found all his symptoms worse; but especially his difficulty of deglutition. He now discharged considerable quantities of phlegm, and his throat was so closed that scarcely any thing could find way to his stomach. Of this fact I convinced myself by causing him repeatedly to attempt to swallow in my presence. In short, he now exhibited the appearance of one badly choaked. So little had he been able to swallow for a few days past, that he complained of great emptiness at stomach, heart burn, and sometimes flatulent distentions. Discovered no aversion from fluids; had no power to move any part of himself, but his head. His case was now extremely urgent, and his danger seemed obviously to arise from the obstruction of the œsophagus and the consequent inanition. I now came to the resolution, and obtained permission, to ascertain by means of the probang, the cause of obstruction in the throat, and this I did the more especially, because it was generally thought at this time by the family and the neighbours, that the choaking was occasioned by a knot of worms, that had made their way up into the throat. Upon the introduction of the instrument, I immediately became satisfied, that the obstruction was not owing to worms; but to an inflammation of a small portion of the œsophagus, which had so diminished its diameter, that it was with difficulty the instrument was made to pass up and down. He felt a smarting sensation, after the instrument was withdrawn, and for a little while could swallow better. A large blister was applied to his neck, and other means attempted, but in vain. He died in a few hours.—I greatly regret that I had not previously been made acquainted with the plan of introducing a flexible tube into the stomach, with a view to convey food and medicine. For as I am persuaded that he died chiefly from inanition, so I believe this plan might have proved the means of saving his life.

Did the paralysis result from the affection of the throat, or was it independent of that affection? Neither my observation nor my reading is sufficiently extensive to authorize me to determine this question, or to say that this is an usual case in the annals of medicine. If similar cases have occurred, and have been recorded, they have not fallen within the range of my research. Is it not a little remarkable that a general paralysis ac-

accompanied this affection of the throat? Does not this seem to indicate that some peculiar sympathy exists between the œsophagus and the nervous system? The hydrophobia has been demonstrated* by Dr. Physick, if I rightly recollect, to have its seat in the pharynx; and with how tremendous a train of nervous symptoms it is attended, need not be suggested. Can the absence of hydrophobic symptoms in this case, be owing to the lower situation of the affection in the œsophagus? In short, if it had been seated in the pharynx, would it have been hydrophobia, attended with spasm, instead of paralysis? The condition of his stomach was precisely similar to that said to take place in persons labouring under hydrophobia. I make these inquiries, because I do not believe, since I have discovered the real nature of this affection, that it was ever as high up as the pharynx, or as low down as the stomach. It is easy to see that it would be difficult to determine the precise point of the œsophagus occupied by the affection: while that affection was still slight, and after the dysphagia became considerable, he always referred the obstruction to the same place.

Since writing the above I have received information of a gentleman, who, a few days since, died near Charlottesville, in this State, of dysphagia, accompanied with universal paralysis. I believe this to have been a similar case; and it was, I understand, supposed to be owing to exposure, after a free use of the mercurial ointment. He died within four days after the attack of the disorder.

To the Editors of the Eclectic Repertory.

GENTLEMEN,

When I sent you the communication published in the first number of the third volume of the Eclectic Repertory, descriptive of what I supposed a new method of extracting poisons from the stomach, I was influenced by a desire to propose

* We believe Dr. Harrison has misunderstood Dr. P. and therefore we refer the reader to the Medical Repository of New York, Vol. 5th, No. 1st, Article 1st.

to my medical brethren a method of treatment which might preserve the lives of many unhappy persons, who either by design or accident had swallowed large doses of laudanum or other poisonous substances. If in a single instance I had been instrumental in preventing death, I should have considered myself very happy; and to have withheld a communication which might have been attended with such beneficial effects, would have been in every respect unjustifiable.

I have the pleasure of announcing to you and to your readers, that in several instances which have recently occurred in this city, the practice has been completely successful.—In two cases treated by Dr. Dorsey, in which large quantities of laudanum had been taken, there is great reason to believe that no other mode of treatment would have succeeded in preventing the fatal event. Both patients were saved by injecting warm water into their stomachs, and extracting it again, together with the laudanum, by means of a syringe.

I therefore am happy in having called the attention of the profession to a mode of treatment not before used in this country, at least within my knowledge; but I have now an act of justice to perform, in ascribing the merit of the invention to Dr. Alexander Monro, junior, of Edinburgh, who published it in his inaugural thesis, in A. D. 1797. Of this circumstance I was entirely ignorant when I sent you my paper, and probably should still have remained so, had it not been mentioned in his book of *Morbid Anatomy*, a work which has but very lately come into my hands.

Very respectfully, I am,
gentlemen, yours, &c.

PHILIP SYNG PHYSICK.

Philadelphia, 20th January, 1813.

*Brief Remarks on the Doctrine of the Nourishment of
the Fœtus by the Liquor Amnii.*

BY N. CHAPMAN, M. D.

[The ensuing article contains a very concise examination of the arguments employed by the late Dr. Darwin, in support of the hypothesis, that the fœtus is nourished by the Liquor Amnii. It was written several years ago, and with no view to publication. Now it is committed to the press, with the hope, that it may contribute to check the progress of what I know to be a great, and so far as regards this country, a spreading error in physiology. My criticism is confined to the arguments of Dr. Darwin, because, really they constitute the whole defence of the hypothesis. I have, perhaps, pushed my analysis to an unnecessary extent. But as the hypothesis, since its recent revival has gained some adherents, and promises to become still more generally received, I thought it deserving of such an investigation as might once more expose its fallacies.

This little Essay lays claim to no originality. The highest and only merit to which it pretends, is, that of exhibiting a tolerable synopsis of facts and reasonings which are elsewhere to be met with, but in a shape more mixed and diffused.]

Brief Remarks, &c.

EMINENTLY calculated to excite curiosity, we find the nourishment of the fœtus engaging the researches of the earliest cultivators of medicine, and the collateral branches of philosophy. More than one of the writings of Greece which have descended to us, contain very plausible explanations of this obscure and intricate process. Even now, when we boast, not without reason, of the improvements of our physiological knowledge, we retain substantially these primitive conjectures, and have done little else than to correct some of their grosser errors, and to prune away a few of their most obvious absurdities.

Who originally maintained that the Liquor Amnii is the nutriment of the fœtus, it is not easy to determine. The suggestion does not belong to antiquity. It seems to have been promulgated about the period of the revival of letters in Europe.

An hypothesis, in itself so imposing, could not fail to acquire a numerous train of advocates. When subjected however

to a severer investigation, its errors were exposed and it experienced the fate incident to such fallacies. Deserted by its adherents, it sunk into oblivion. But from this state of dereliction, it was, after a lapse of half a century, again revived and ushered into notice by the author of *Zoonomia*. With all his learning and ingenuity, this celebrated writer has brought to its defence not a single new fact, or additional argument. Yet such is the authority of Darwin, that any hypothesis deliberately sanctioned with his approbation, whatever may be its intrinsic defects, can not be passed over with contumely and neglect. What, therefore, he urges in vindication of the position, that the fœtus is nourished by the Liquor of the Amnios I mean critically to examine, and to attain greater perspicuity, I shall apply my strictures to each link of his argumentation, though not exactly in the order which he has adopted.

1. It is contended by him that the *Liquor Amnii* is not an excrementitious fluid. In this opinion I entirely acquiesce. It cannot be the sweat, the urine, the saliva or the mucus from the nose of the fœtus, as has been ridiculously imagined: nor indeed, can it be any other fœtal production, because it exists in a considerable quantity in the early months of gestation, before the fœtus has a single organ completed by which it could be formed, and as it is found in blighted ovula in which there is no fœtus. It seems, most probably, to be an exhalation from the arteries of the amnios. But does not the known disproportion between the quantity of the fluid, and the size of the fœtus very strongly militate against the supposition that it is intended for the purpose of nutrition? We are told by Haller that very little of it remains in many animals at the time of birth, and that in rabbits, especially, there is none. This fact is fully confirmed by the observations of Harvey, De Graaf, and Monro. In the human species it is clearly ascertained, that the relative proportion of the fluid is far greater in the early than in the latter months of pregnancy. We indeed sometimes meet with cases of parturition where it is totally wanting. These, in consequence, are emphatically termed *dry labours*. But there is another circumstance relating to the *Liquor Amnii* which strengthens the conclusion I am endeavouring to enforce. It is always in

the last stages of gestation more or less vitiated, and sometimes is exceedingly acrid, and even bloody, putrid, and offensively feculent. Were it really alimentary, as is alleged, is it not certain that it would be supplied in a ratio to the increased demands of the fœtus, and continue throughout a pure, unmixed, uncontaminated fluid?

2. It is contended, that the *Liquor Amnii* is a nutritive fluid, as it coagulates by heat, by nitrous acid, and by the spirit of wine, like milk, serum of blood, and other fluids which daily experience evinces to be nutritious. After what I have said, if it be admitted to be true, it is hardly worth the trouble of inquiry whether or not it possesses the properties here ascribed to it. The truth, however, is, that the preceding account of its properties is totally incorrect. By chemical analysis very accurately made, it is proved that no nutritive substance enters into its composition, neither sugar, oil, nor mucilage. It, on the contrary, yields water holding in solution volatile alkali, muriate of soda, phosphoric acid, some earth, and the red calx of iron. Nor does it coagulate as is represented. When heat is applied to it, or it is mixed with spirit of wine or nitrous acid, the only change it undergoes is that of becoming more turbid.

3. It is contended that the *Liquor Amnii* has been actually discovered in the stomach, which he conceives is enough, alone to determine indisputably its use in the fœtal economy. But let us look into the nature of the evidence, and the sources whence it is derived, before we assent to such an inference. By consulting his work, it will be seen that even Darwin's extensive intelligence and various erudition have brought to aid his inference only two cases, and these of a description the most equivocal and unsatisfactory. They, besides, did not occur in the human species. The first of the two cases is recorded by Slade, an old and fabulous writer of slender repute, who relates that he once detected among the fœces of a fœtal calf some hairs of the same colour of those on its skin, and hence surmises that the calf must have licked them off and then swallowed them with the *Liquor Amnii*. Not to dwell upon what is unworthy of serious scrutiny, I shall merely remark that a circumstance is in the case presumed which can never happen. Though the fœtus when approaching to maturity has an im-

perfect muscular action, it can not make many or extensive motions. Coiled up, so as to adapt itself to the circumscribed capacity of the uterine cavity, it is unable, even if it had muscular power, to change its position so as to perform the actions here ascribed to it. But though hairs were actually found in the excrements of the calf, it would not necessarily follow that they were swallowed, much less that the *Liquor Amnii* is the food of the fœtus. We know that there is hardly a viscus, or part of the body, which is not subject occasionally to a growth of hairs. They have been described as existing in the urinary bladder, the omentum, the intestines, and even in the heart and arteries.* The second case occurs in Heister's *Compendium of Anatomy*, and as it is briefly told, I shall quote it in his own words. "I received," says he, "a full formed perfect fœtus of a cow, inclosed in the uterus and membranes, in cold winter weather, where not only the liquor of the amnios which surrounds the fœtus was frozen, but the same liquor was found frozen in the mouth, œsophagus, and stomach, like one continued substance. The column of ice in the œsophagus was about an inch thick. I happened to see the same another winter." The fallacy of the preceding case is too obvious to require a single remark. Congelation can not take place while the animal is alive. The common temperature of the body will not allow of it. It is, therefore, clear that the column of ice was not formed by a stream of fluid in deglutition. If it happened at all, which is very improbable, it must have been owing to the pressure of the waters into the œsophagus by the expansive force which is exerted in the freezing of fluids.

4. It is contended, that the *meconium* found in the bowels of new born infants attests that something has been received into the stomach, and what, he triumphantly demands, can it be except the *Liquor Amnii*? To this I reply, that whatever may be the materials of the *meconium*, that it cannot be thecrement of the fœtal aliment entering by the mouth, as animals of different kinds have been born with it, though the communication with the stomach was wanting. Thus Bellinger, in his excellent *Treatise on the Nourishment of the Fœtus*,

* Monro.

describes a pig with its mouth entirely impervious, yet had its alimentary canal filled with the *usual contents*: and M. Antonie states in the history of the Academy of Sciences for the year 1763, that he once met with a lamb the "stomach and intestines of which were replete with a glary yellow matter like to excrements, which was without head, heart, lungs, pancreas or *liver*." In the Edinburgh Medical Essays there is also a case related by Mr. Calder, a surgeon, of a child in whom no passage existed between the stomach and intestines, but still the latter contained "a small modicum" of meconium. The preceding facts, which no doubt might be multiplied by more extensive researches, are quite sufficient to overturn the hypothesis which I am combating. With regard to the meconium, it is to me manifestly the product of the alimentary canal.* It has been supposed to result from the bile poured into the intestines. But how can we reconcile such a supposition with the existence of the meconium previously to the liver being in a state to perform its secretory function, and where, indeed, the animal has been *curtailed* of that organ! By many writers it is remarked that the stomach and bowels of the fœtus contain, during every stage of gestation, more or less of mucous matter, differing however from the Liquor Amnii, in its colour, consistence, and other qualities.† It is this mucus, gradually accumulated, and imperfectly digested, which most likely constitutes the meconium. Can we believe that the meconium is the excrementitious part of the Liquor Amnii, when it is recollected, that though the fœtus continues nine months in utero, it rarely, and perhaps never, except when the sphincter ani is relaxed by death, discharges it. Did the fœtus feed upon the fluid, it would regularly void fæces,

* Haller thought it was the remains of the fluid exhaled by the intestines, as, says he, "I have seen a similar substance in other cavities, and in the vaginal coat of the testicle."

† The stomachs of the youngest fœtuses we can dissect are full of a mucous liquor, which remains of nearly the same consistence all the time of gestation, except that it becomes gradually somewhat more viscous as the fœtus increases. "This has obtained in all the different animals, I have had occasion to dissect. The small guts of fœtuses are full of a glary mucilaginous liquor, which becomes thicker and darker coloured as it descends to the great guts, where it is collected under the name of *meconium*." Monro.

or the accumulation must be immense. We know, however, that the aggregate of the discharges at birth does not exceed, in quantity, the evacuations of a single day after the child is nourished by food taken into the stomach.

5. It is contended, that the albumen of the egg has been found in the stomach of the chick in ovo, like the *Liquor Amnii* in that of the fœtus, and hence he infers, that they are nourished in the same way. Analogies, as has been well observed, are better adapted to the purposes of illustration than of proof. They can indeed be rarely trusted in the discussions of science. To be admitted, at all, they must be close and pertinent. The analogy, in the present instance, is not of this kind. There is no resemblance between the two fluids. The chemical analysis of the *Liquor Amnii* I have already mentioned. Its properties would seem to denote it to be, though in fact it is not, excrementitious. It is often too, nauseous and feculent. The albumen, on the contrary, yields saccharine matter and gluten, and therefore is nutritive. Nor is it ever vitiated. During incubation it remains sweet.* These distinctions destroy the force of the analogy. Nevertheless, were it indisputably settled, that the chick is nourished in the manner stated, the argument derived from the analogy would certainly be intitled to some weight. But this has not been done. We have not the slightest evidence of the chick feeding upon the albumen. Nothing has been determined upon the point, except that the stomach of the chick throughout incubation contains a glutinous fluid, which, however, we learn with certainty is the product of the alimentary canal and is incident to the fœtal state of all animals.† Of the objections, which I have raised to the *Liquor Amnii* being the

* Monro's experiments are conclusive on this point. They have been repeated by me and with the same result.

† "The mouth, œsophagus, and ingluviæ, are always found moist, but never contain any quantity of liquor that can be collected, or will run out in drops. The bulbous glandular point of the œsophagus immediately above the stomach, or what Peyer calls the *infundibulum*, and the stomach, are full of a liquor, in the youngest chick we can dissect, and continue full the whole time of incubation. This liquor of the stomach is at first thin and more watery; afterwards it becomes curdy, and at last is always in form of a grayish white mucous." Monro.

pabulum of the fœtus, nearly the whole might be urged with equal effect against the nourishment of the chick by the albumen. But waving these altogether, I shall rest the confutation of the latter hypothesis upon different and specific grounds. Not the weakest of this new series of arguments which I am to submit, is deduced from the particular position of the chick in ovo. Without entering into a detailed description, it is enough for my present purpose to mention that the chick lies on its side, with its neck bent forward, and so much so that its beak is placed between its thighs, and that its head is entirely covered with its upper wing. Thus arranged, it so completely occupies the cavity of the shell, that it can hardly alter its posture. With its head fixed under its wing, how can it, I inquire, drink the albumen? But there is a second impediment to its access to the fluid. The albumen, as well as the vitellus, is held in a distinct membranous sac, with which the chick has no communication. This vesicular conformation is a provision of nature to prevent the escape of the fluid. Were it ruptured, the fluid would flow out, and be mixed with the other contents of the egg. But, the advocate of the hypothesis has himself made, very inadvertently, an acknowledgment which is fatal to his conclusion. We are informed by him, and the fact is confirmed by the observations of others, that the albumen of the egg of the hen is entirely exhausted at the expiration of the eighteenth day of incubation. What is the food of the chick during the residue of its fœtal existence? No other source has been assigned. The chick, therefore, according to him, is left for several days destitute of nourishment. The very time that it requires most food it is totally without it. For those who may require other proof, I will add the result of my own experiments. I have ascertained beyond controversy, that the egg, not fecundated, likewise loses its albumen from the fifteenth to the eighteenth day, and hence the corollary is plain, that the fluid is evaporated by the heat of incubation, and is not consumed by the chick.*

* From what I have observed, it seems, that prior to the twelfth day the albumen suffers no diminution either in the *fecund*, or the *infecund* egg. This I believe is owing to its not having attained sufficient tenuity to escape through the pores of the shell. After this period however it rapidly disappears.

6. It is maintained, that in those cases of monsters which have been born without the natural passage to the stomach, there invariably exists a vicarious opening, and that this uniformity proclaims the solicitude of nature to provide a passage for the transmission of the *Liquor Amnii*. There are two cases adduced in defence of this position. The first of a child with an impervious gullet, who had an opening into the trachea and œsophagus; and the other of a lamb without a head, having an aperture in the lower part of the neck. As these are the only cases which the supporters of the hypothesis have as yet collected, it is presumable that they are all which can be produced. The records of medicine and the museums of Europe are full of examples to the contrary.

The two instances, therefore, which are brought forward by Darwin to establish the position of the universality of the vicarious passage, so far from doing it, must be considered as rare and anomalous exceptions to the rule, and when contrasted with the innumerable examples of an opposite kind, can hardly weigh as the dust in the scale of impartial decision.

With this I conclude the inquiry into the defence of the hypothesis before us. No other argument remains to be noticed. It results, I think, pretty distinctly from the preceding exposition that the *Liquor Amnii* is not the food of the fœtus. Most of the considerations which warrant this deduction have already been detailed. They may perhaps, however, be presented again with advantage in a view more converged. We say then, that the *Liquor Amnii* does not answer the purpose imputed to it in the fœtal economy.

1. Because the fluid is not nutritious, being at every stage destitute of such properties, and in the latter periods of gestation is always less pure, and often becomes acrid and exceedingly *putrid, feculent, and bloody*.

2. Because it exists, for the most part, in an inverse ratio to the age of the fœtus, and its demands for nourishment.

3. Because the fœtus has been born in numerous instances without any passage by which the fluid could be introduced into the alimentary canal.

4. Because, prior to the expiration of the third month, the stomach and intestines of the fœtus are in a soft and pulpy

state, totally unfit to receive, or to perform their appropriate action on any alimentary substance.

It would seem, indeed, that during the growth of the fœtus, few, if any, organic functions are performed. While in this state of existence, the operation which goes on almost exclusively, is the evolution and perfection of its different parts. Till this end is accomplished, all the organs, with one or two exceptions, continue quiescent and inactive. The brain is without consciousness, the nerves without sensation, the muscles without voluntary motion, the stomach without digestion, the intestines without peristaltic action, the lymphatics without absorption, the lungs without respiration, the glands without secretion; and in an equally passive condition are the organs of sense. It is the heart and bloodvessels alone which to any extent execute their functions during uterine existence.*

Whatever, therefore, may be the mode by which the fœtus is nourished, certain it is, that its own organic action is little concerned in the process. Of this, we can require no other proof, in addition to what has already been mentioned, than that it continues to grow, though destitute of some of those organs, without which life, after birth, could not be sustained even for a moment. Cases of undoubted authenticity are recorded where fœtuses have attained to the full size, and in other respects were perfect in their conformation, in which the brain, or heart, or lungs, or one or more of the viscera of the abdomen were wanting. The subsistence of the fœtus is obviously altogether parasitical. The food which it derives from its parent, through the mediation of the placenta, comes to it properly assimilated to enter at once into its organization. By the previous elaboration which it undergoes the aliment is almost wholly divested of the grosser and excrementitious matter, and it is on this account, that the excretions of the fœtus are so inconsiderable in quantity.

Philadelphia, Dec. 25, 1812.

* Saumarez's Physiology.

Observations on the Generation and Introduction of CONTAGION by Ships. In a letter to the Editors, from Col. J. WILLIAMS, President of the United States Military Philosophical Society, &c.

WITHOUT engaging in the controversy relative to the importation of the yellow fever, or its generation, in a foul atmosphere, in any country, I may be permitted to state some facts, and to draw such conclusions as these facts will evidently justify, on the peculiar facility of the importation in sea vessels.

A sea vessel must be made *water-tight*, or it could not float on the sea: it must be closed above as well as below, or it would be liable to be filled by the sea washing over it in a storm, and the cargo must be compactly stowed, or it would change its position, by the tossing or rolling of the ship, and endanger its very existence. From these considerations, it is self-evident, that a ship must be *air-tight* as well as *water-tight*, and a portion of that atmosphere, whether pure or foul, in which the cargo was taken in, would be transported with it to the place of its destination, with this single difference, that if pure, it might, by its confinement, become foul, but if noxious, it might, from that cause, become more offensive, but could never become pure.

To illustrate this statement, and to take a more comprehensive view of the subject, let us examine the construction and general situation of a ship and its cargo, during a voyage from any place within the tropical regions.

Of the Construction of a Ship.

The hull (the only part necessary to be examined in this inquiry) is composed of timber and plank. The frame may be called its skeleton, and the plank its external skin. This description applies to its deck, as well as to its bottom and sides, all being *water-tight*; and, except by the apertures of the hatchway and forecastle, which are both covered with tarpaulins, and battened down when at sea, neither air nor water can enter or escape. Some, indeed, may force its way through the crevices of the bulk head, when the lower deck is not flush fore and

aft, and some gets through the store room, on the occasional opening of the after scuttle, to the great annoyance of the passengers and people in the cabin and steerage. The ribs of this skeleton are of a certain thickness, and are at a certain distance from each other, so that, between the ceiling (that is, an inside lining of plank nailed on these ribs) and the bottom, there are spaces, the cubical contents of which are equal to the square of these spaces multiplied into the thickness of the ribs.

These form receptacles for all the foul air, especially that which is more ponderous than the external air, and, by its coolness, (being below, and consequently of the temperature of the water) even the same kind of air would be more heavy than the circumambient atmosphere, which, in the West-Indies, is generally from eighty-five to ninety-five degrees. But as it is not necessary that the ceiling of a ship should be tight like its bottom, whatever filth there may be in a liquid state, within the ship, must filtrate through the seams of the ceiling, (which are always open) down to the limbers on each side of the keelson. There are in all ships, holes or notches cut in the floor timbers, close to the bottom, in order to permit what water may be in a ship to run into the well-room, where the pumps are placed; but whatever will not filtrate through these passages must remain in the limbers; and, accordingly, whenever a ship is discharged, a plank of the ceiling on each side of the keelson (which is generally left loose for the purpose) is taken up, and the limbers are cleared of all the filth collected during the voyage.

Every man who has been at sea in a tight ship, has been sensible of the stench of the bilge-water, or the accumulated filth in its liquid form, as soon as she quits the port, owing to its agitation by the ship's motion: and every captain of a ship knows, that the colour of the paint in his cabin becomes changed, precisely as the colour of the paint in privies on shore is well known to be changed by foul exhalations. This is so well understood among seamen, that, to designate a tight ship, they always say, "*she does not make water enough to keep herself sweet;*" and, in many instances, they have a plug in the run abaft, and below the water line, purposely to let in sea water to mix with the foul water within, and raise it high enough to be

pumped out. The pumps, it will be remembered, cannot take up all the water, for there must be a hole at the side of each of them to let the water; enter and, the moment the water is below the superior part of the hole, the air will rush in, and the pump will suck; besides, owing to the position of a ship under a press of sail, or by pitching and rolling in a sea, a great part of the water between the ceiling and bottom does not get to the pump.

Of the Cargo of a Ship.

Our inquiry confines us to the produce of the West-Indies, and of other tropical countries, such as sugar, molasses, cotton, coffee, cocoa, and fruits in general. Rum is sometimes imported, but, since the almost universal use of brandy, this now makes an inconsiderable part; what is usually mixed with other parts of a cargo would not correct the effluvia, but only serve to render them somewhat more volatile.

In loading a ship, the heaviest articles are put lowest, for obvious reasons, that relate to the navigation of a ship. The sugar and molasses then, go into the bottom; the coffee and cocoa go into the wings and the interstices among the casks, and the cotton is stowed above all. Here then, it is evident, that the kernels that may drop from the bags, the oozings from rotten fruit, and the filtrations or leaks from the sugar and molasses, will all find their way to the limbers; and there, in the temperature of at least eighty degrees, go into a state of fermentation, or into bodies capable of imbibing it, while the air, generated by that fermentation, will ascend, and be as much as possible imbibed and retained by the cotton. In proportion as air is generated, the whole will become compressed, and give a great velocity to that which might be forced through crevices, &c. Add to this, the issues from the barrels of provisions, from the casks of water, grown foul by long keeping in stagnant air, of waste of every kind made by the sailors between deck, in short, every thing of a filthy kind will find its way to the bottom, and add to the general fermentable mass, always keeping the hold full of compressed foul air. Even the cleanliness of the cabin accumulates the filth below, by washing every thing down into the hold.

This description of a ship and her cargo is purposely made,
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with strict attention to the naked facts; and all the effect of negligence, and want of judgment, which many circumstances would justify much reliance upon, in support of the conclusion, are omitted, because the argument is not intended to rest upon accidental or extraneous particulars. The statement evidently shows, that if the germ of the yellow fever be thus *boxed-up* in the West-Indies, it will remain in the best possible hot-bed, till it be brought to sprout in the neighbourhood of our wharves.

Much has been said about the filth of our docks and slips, but these are covered with water, in the motion of rapid tides, at both flood and ebb, and, at the worst, are exposed to the constant action of an active atmosphere; while, on the contrary, a ship has, for several weeks, the noxious vapour carefully kept in vessels, almost hermetically sealed, without the least chance of dissipation. Let a large diving-bell be placed upon the bottom of a very filthy dock, for the whole time that a ship is coming from the West-Indies, and then we might admit of a comparison between the noxious vapour contained under one and within the other. Or to make a more appropriate, and, perhaps, a more accurate comparison, let one of our mud-machines, said to have been so productive of deleterious air at Brooklyn*, be covered with an air-tight deck, and kept four weeks in a temperature never less than eighty degrees; and then, on a sudden, be opened, and the air let loose in a populous neighbourhood, by no means remarkable for its cleanliness, and some affinity between the cases might be claimed; but even then, the quiet residence in a calm dock would bear no proportion to the agitation of a tempestuous sea.

Every man of any chemical knowledge will admit, that air, as well as other fluids, might, in a calm state, exist in strata, according to their density, just as we might make different strata of water, spirits, alcohol, and ether; yet, all being colourless, the bottle would present to the eye a homogenous appearance; so, of air, where the densities differ in the proportion of one to fifteen, perhaps more, without being distinguishable by sight, a perfectly quiescent state would render the comparison much in favour of the mud-machine. Agitation is very favour-

* Brooklyn is on the east river, opposite to New York, where this essay was written.

able to fermentation, and the intermixture of all the air, generated by the fermentation of various substances, is sure to affect the whole mass with the deleterious quality.

But there is another point of comparison which is not inapplicable to this subject: our climate is the most changeable in the whole world; the different seasons show a range of thermometrical graduation of more than one hundred degrees; and even in the same season, often in the same day, the variations are very great, while in any case, either of heat or cold, the same temperature seldom lasts three days. We have frequently seen a fall of snow and summer heat within the space of a few hours.

In the West Indies, on the contrary, there is a perpetual summer heat, scarcely agitated by the gentle sea and land breezes which, like the flux and reflux of the tide, carry off and bring back the noxious particles contained in it alternately. It is only in the hurricane months that nature restores salubrity by violent atmospherical agitation; this is the season of health; and this is precisely the period when, in the course of commercial arrangements, American vessels are not there.

The foregoing remarks apply generally to the construction of a ship, the nature of its cargo, and the occurrences relative to both in the course of a voyage. But it may not be improper to add a few particulars relative to the passengers and people during the same period. We are very sensible on shore of the importance of personal cleanliness; and this is aided by the conveniences of frequent washing, the means for which, even the most indigent have always at command.

At sea, only salt water can be used for this purpose, owing to the limited quantity and important use of fresh water on ship board. It is often prohibited even to wash the hands and face in fresh water; and it is never allowed for washing of cloathing of any kind. Soap is not miscible with salt water, and is of no use whatever. Of late, indeed, it has been discovered that fuller's earth, mixed with salt water, will render it apparently softer, and it is thence imagined that it answers the purpose of soap. This, in some degree, may be true, since the earth may take up a part of the oleaginous substances, with which foul linen, &c. is usually impregnated. But cloathing washed in salt water, will never become perfectly dry in a

moist atmosphere, owing to the salt which is always retained, and which is perpetually imbibing moisture. For these reasons there is but little washing done by the crew, and none by the passengers, whose linen retains all their sea sick filth. Now let us imagine a case to happen in a house at the sea side, in a warm climate. Suppose that there were but two apartments in this house, just as large as the cabin and steerage of a ship; that the bedsteads were fixed to the walls like cabins, and that, like the cobbler's stall, they answered the purpose of every usually inhabited apartment. We allow a beach as large as a ship's deck, and the cooking to be done in the open air; but there must be no pump, and only salt water can be used, except for cooking and drinking, and all the fresh water must be kept in casks during the whole time. What would be the situation of such a family at the end of one month? Would there not be reasonable apprehension that a malignant fever would be generated there? And let me ask, if among our most indigent citizens, who inhabit such places as the yellow fever has appeared in, any house has been found in the situation described. Yet any man who has been a few weeks at sea, will recognize the fidelity of the representation, as it relates to a sea vessel; and who has ever boarded a ship at the instant of her arrival, without feeling an impression of disgust? Yet all good captains take care to make the ship herself as clean as possible, just before they expect to arrive. When in port, the passengers land their baggage, and give out their foul cloathing, and the crew also open their chests to have a general washing; and all the confined effluvium, like that of Pandora's box, is immediately scattered in every direction.

A celebrated French writer on the customs, manners, and general habits in Turkey, (Baron de Tott) in speaking of the plague, has this remarkable passage: "La cause qui la propage et le foyer qui la conserve, se trouvent l'une et l'autre, chez les marchands frippiers à Constantinople." So that, according to this author, if the sale of old clothes were prohibited in that city, that terrible scourge might be arrested in its awful and deadly progress. The application of this remark is too evident to need further observation.

Nothing in this description is intended to apply to ships ar-

iving from more northern countries, nor to ships of war. The writer has, in many instances, witnessed the cleanliness of large ships to and from Europe, and along our own coast; and he has, with great satisfaction, observed the efficacious use of wind sails in this and other harbours. But the necessity of these judicious preventives, under such favourable circumstances, serve more strongly to enforce all the foregoing observations, when applied to such small, confined, and generally unhealthy vessels as are usually employed in the West-India trade, and the infectious kind of cargoes imported in them.

Like causes will produce like effects, and hence it may be concluded that (if all circumstances were equal,) the yellow fever may be generated in one place as well as another; and since so much stress has been laid on the occurrences of a voyage, the foregoing statement goes as fully to support the doctrine of generation as it does of importation.—This is granted: it only remains to show the similarity of the causes; but among these, it will be impossible to place those of the voyage: it will likewise be difficult to show a similar state of the atmosphere for any length of time, in our variable climate, and in that of tropical regions. And there will be allowed some difference between the fermentable nature of the productions of the two countries, and the exhalations emitted from them.

But why should we keep up any controversy upon this subject? There cannot be too many nor too strong motives for cleanliness in our populous cities; why then may not the supporters of the doctrine of generation be indulged in all the means recommended for the prevention of disease of any kind, and in turn, why should not they have an equal degree of complaisance for the supporters of the doctrine of importation? It would not be prudent to leave your house open in the night, because you may have a thief within it, nor ought it to be concluded that all thieves are from without: let us therefore be prepared at all points, and support with equal zeal our quarantine laws and salutary regulations, as well to prevent the importation of the disease from abroad, as to guard against its domestic origin.

MEDICAL AND PHILOSOPHICAL INTELLIGENCE.

REPORT OF THE PROGRESS OF CHEMISTRY.

[From the Monthly Magazine, for January 1813.]

The interesting experiments of M. Kirchoff, of St. Petersburg, proving that starch may be converted into sugar by the action of dilute sulphuric acid, have been eagerly repeated by the most distinguished chemical philosophers in Europe. This singular conversion is produced by boiling 100 parts of starch with 400 of water, and from two to eight parts of strong sulphuric acid, in an unglazed earthen vessel for a period of from 24 to 36 hours, constantly stirring the mixture during the first hour, (after which it becomes more fluid) and carefully maintaining the original quantity of water by adding more as it is wasted. Upon growing cold the mixture must be neutralized with chalk, and clarified by charcoal; filtrated through flannel, and evaporated to the consistence of oil. It must then be again cooled, in order to remove its sulphate of lime, and the clear liquor, if further gently evaporated, will yield about 100 parts of gummy syrup of the specific gravity of 1.295, easily susceptible of vinous fermentation, and when separated from the gum, which in general forms no less than a fifth part of it, capable of being crystallized, and applied to all the common purposes of native sugar. With the rationale of this very important transmutation we are not yet acquainted. It is plain, however, that the acid still exists undecomposed, and there is reason to believe that the quantity of water is increased. The probability therefore is that the agency of the acid is exerted in abstracting from the starch a part of its hydrogen and oxygen, in the proportions requisite to form the excess of water, and in thus enabling its remaining principles to be in such a way arranged as to induce the extraordinary change effected.

An easy method of comparing the quantity of light which bodies emit on burning, has been given us by Mr. NICHOLSON. He says, that, when the shadows of the same object, projected on a wall by two lights, are equally dark, the lights themselves are equally intense—that, if not, the darkest shadow will be

projected by the interruption of the brightest of the lights; and that, if this brightest light be then removed farther from the wall till both shadows become equally dark, and the distances of the lights from the wall be in that situation measured, the intensity of each will be in proportion to the square of its distance. For example, if two lights give shadows equally black or dark, when their distances from the wall are respectively five and seven feet, the intensity, or quantity of light emitted from them, will be respectively as 25 (or 5×5) and 49 (or 7×7).

A heavy viscid oil, possessing the flavour of hops united with the odour of nutmegs, and burning with a greenish flame, has been produced by transmitting chlorine gas through oil of turpentine.

From a series of elaborate experiments by M. BERZELIUS, of Stockholm, now in London, we have additional reason to believe that the base of silica is of a metalline nature, the ingenious professor having succeeded in uniting it to iron and other metals, without impairing their metalline properties.

From the same able source, we expect soon to have the pleasure of announcing to the scientific world, the publication of some observations upon Nomenclature, a work which, owing to the rapid strides of modern chemistry, is already very much required.

The proposal of Sir Humphry Davy to introduce into the processes of bleaching calicoes and linens, the use of oxymuriate of magnesia, has experienced but slight attention, on account of the enormous price of this new agent, when compared with that of oxymuriate of lime; a substance which has been successfully employed for many years, and which, moreover, has been proved devoid of those injurious qualities, even when in a concentrated state, from whose supposed existence the proposition of the celebrated Professor originated.

Mr. Sylvester, of Derby, from having ascertained that the amelioration which rum experiences by being kept for some time in its cask, arises from an union of the gallic acid of the wood with the lead, which new rum generally contains, and on which depend its well-known pernicious properties, has been induced to offer this acid as a convenient test for the discovery of lead in cyders, wines, and other liquids, where its presence

is suspected. The same gentleman proposes also to detect arsenic, by the green precipitate occasioned by the addition of an acetate of copper, prepared by decomposing sulphate of copper with acetate of lead. And the presence of corrosive sublimate he recommends to be demonstrated by reducing its mercury to a metallic state upon another metal, (by silvering a golden ring for instance with it) by the agency of galvanism.

A Prussian chemist, by the aid of galvanism, has united the constituent principles of blood into a substance of a reddish colour, which, he asserts, is very similar to the noble vital fluid itself. But that this is utterly impossible, must be the conclusion of any one who weighs the immense difference between vital and chemical action; and we are truly sorry at seeing the ingenuity of so able a gentleman applied in the search of an object so unattainable; for, as Arbuthnot has well observed, "no chemist can make milk or blood of grass."

ROYAL SOCIETY.

Dr. Wollaston, availing himself of the facts reduced to practice by Leslie, in freezing water by means of evaporation in vacuo, described an instrument with which this process might be effected for amusement. Taking a glass tube of any length, such as is used for barometers, making a bulb on each end of it four times its diameter, nearly filling one of these bulbs with water, exhausting the tube of air by boiling the water, and hermetically sealing it like a thermometer, and afterwards plunging the bulb into a mixture of salt and snow, ice would be immediately formed. This might be repeated as often as wished, in a tube three feet long, when the effects of extracting heat from the water would be very distinct to the eye.

Sir Everard Home furnished a short paper, containing some remarks on the solvent glands and gizzards of the different species of cassowary in New South Wales, and the African ostrich. It appears that these organs are always adapted to the native climate and to the quantity of food which the fowl can procure. The length of the intestines, and their magnitude, seem dependent on the like cause.

Tilloch's Philo. Mag.

On the Composition and use of a new Solution of Ferrum Tartarisatum.—By GEORGE BIRKBECK, M. D.

IN consequence of some experiments on the preparation and properties of ferrum tartarisatum which were mentioned in the tenth number of the London Medical Review, I have been induced frequently to employ it dissolved in water, in various states of disease. Having found that the medicinal efficacy of the iron was equal if not superior to that of any preparation in common use; and likewise that the ferruginous flavour was much less perceivable than in any other compound of an acid and the same quantity of the metal, I have recommended to several practitioners, its employment instead of vinum ferri, mistura ferri composita, or ferrum vitriolatum. From many of these I have received favourable reports of its operation, and I am therefore desirous through this medium still further to extend the knowledge of it.

When water is poured on ferrum tartarisatum prepared according to the imperfect directions contained in the London Pharmacopœia, a portion is dissolved; but as it contains much metallic iron, with very little of the tartrate of iron, a medicine is formed of very trifling power. Even when the ferrum tartarisatum is made according to the judicious directions conveyed in the publication before mentioned, an imperfect, although much more powerful, solution is obtained. This solution is imperfect because liable to decomposition and change, even if kept in close vessels. In order to obviate this imperfection, Mr. Phillips, who has prepared all the solution with which the trials have hitherto been made, has adopted the following process.* Sixty-four parts of cream of tartar are to be mixed with thirty-two of filings of soft iron: to the mass, during the action of the tartar upon the iron, water should be occasionally added; and the digestion is to be continued until it appears, by the test of litmus paper, that the acid is perfectly saturated with iron. To this seven times its weight of water is to be added, which easily dissolves the tartarised iron, when triturated, and the

* Vide an Experimental Examination of the last edition of the Pharmacopœia Londinensis, by Richard Phillips. Page 99.

fluid readily passes through the filtre. For the purpose of saturating any redundant acid, Mr. P. has recently added ammonia, expelling that which may be in excess by subsequent exposure to heat. After standing some time there is a deposit of tartrate of lime from the solution thus prepared, which being removed, it is permanently transparent. The colour of the solution is a deep greenish brown, having, when the acid has been perfectly saturated, very little of the chalybeate taste. It contains about one eighth part of its weight of tartarised iron, or about 3.3 per cent. of peroxide; indeed the quantities have lately been so adjusted by Mr. Phillips, that each fluid ounce of the solution contains exactly sixteen grains of the oxide.

In exhibiting the *solutio ferri tartarisi* it may be mixed with plain water, or with any of the aromatic waters. It may also be given along with the tonic and bitter vegetable infusions, and with any of the carbonated alkalies, or even pure ammonia, none of these having the power to decompose the tartrate of iron. In all the cases in which iron is indicated this preparation may be employed; and it seems peculiarly well fitted for those disorders in which the nauseous mixture recommended by Dr. Griffiths has been found beneficial. Judging from a few instances in which it has been tried, the combination of this solution with carbonate of ammonia, is likely to afford the greatest advantage to persons labouring under some forms of scrophula, that medicine alone can produce. The dose for children, who take it without difficulty, should vary according to the age from twenty drops to one drachm: adults may take from one drachm to three; or even half an ounce if sufficiently diluted.—*Lond. Med. Rev. No. 163.*

Miscellaneous Communications. By WM. SIMMONS, Surgeon.

The first of these gives some account of an anomaly in vaccination. This anomaly is an instance, in Mr. Simmons himself, of receiving the vaccine disease in its regular and efficient form, after having, many years before, passed through the small-pox.

2d. *On the utility of Diuretics in Ulcers situated on the lower Extremities.*—The production of an increased flow of

urine, Mr. Simmons found a powerful auxiliary in the cure of these ulcers, accompanied, generally, with an œdema of the leg.

3d. *On the property of Arsenic in Cancer.*—This is on a subject of such importance, that we shall cite the whole of Mr. Simmons's observations.

“The property of arsenic, taken internally, of allaying the pain of cancer in the ulcerated stage, is already before the public. In the common cancer, and in that variety of cancer to which chimney-sweepers are incident, its effects are nearly similar. In both it improves the quality of the discharge from the ulcer, and alleviates the pain, without inducing stupor or disposition to sleep. Hence it may be considered as an *antalgic* rather than an *anodyne* in such cases.

“In the year 1810 an elderly gentlewoman took the ‘liquor arsenicalis’ in a case of cancer of the right breast, twice a day for three months. Her sufferings were extreme before she entered on this course; soon, however, the arsenic gave her ease, and, with a few exceptions, kept her easy during the remainder of her life. These exceptions for the most part took place when the tubercles were about to exfoliate; after the exfoliation, the pain again subsided, the hollow granulated; the granulations were florid and healthy-looking, and the secretion from them purulent. By these means, she was kept tolerably easy, compared with what is usually suffered, as she gradually sunk; nor did she experience any of those unpleasant symptoms which are said to arise from the continued exhibition of arsenic.

“As the pain in the common, and in the chimney-sweeper's or soot cancer, is alike alleviated by the internal exhibition of arsenic, may we thence infer the *identity* of the poison in these two diseases? If a different cause can produce the same morbid change of structure in a part, there is no difficulty in conceiving a similarity of function in the subsequent action of the part, however dissimilar the original cause might have been.”

4. *On the property of Iron in Cancer.*—Two cases of cancer are related, in which the treatment was conducted according to the suggestions of Mr. Carmichael. In both instances there was a mitigation of the burning sensation spread over the ulcerated

surface; but this was not permanent; and both cases terminated fatally.

5. *Case of Occult Cancer.*—There was nothing unusual in the operation. “On examination of the tumor after extirpation, it appeared to consist of an homogeneous substance, of a texture so hard as to resound when scraped with the scalpel; but there were no white bands, or intersections of any kind.”

6. *On the Liquor Ferri Alkalini* (Lond. Pharm. 1809) in *Scrofula*.—In swellings of conglobate glands, and in scrofulous ulceration, Mr. Simmons has exhibited this remedy extensively, and with more benefit than any other preparation of iron or cinchona. He prescribes it in the common dose, largely diluted with water, two or three times a day, according to the sensible effects, increasing or lessening the dose, so as to procure not more than two evacuations from the bowels in twenty-four hours. Besides its operation on the bowels, the kidneys are stimulated to an increased action, and a considerable flow of urine is often the consequence. To these properties of a diuretic, and an aperient, belong those of a tonic, since the appetite and general strength are materially improved by it.

Lond. Med. and Phys. Jour. No. 162.

A new method of curing the Itch has been proposed by Doctor RANQUE, Clinical Professor at the Hotel Dieu at Orleans. It consists in washing the affected parts with a lotion composed of decoctions of opium and staves-acre. This method has the advantage of cleanliness; no unpleasant smell is imparted by the lotion, nor can the least bad accident or inconvenience arise from the use of it, either during the cure or afterwards. This treatment is equally effectual in the most inveterate itch as in the recent disease; in the simple itch, or when it is combined with any other eruptions; in those which are critical, as well as those produced by contagion. Dr. R. has also applied this lotion with great success in herpes and tinea. Four bottles are usually sufficient for a cure in the most inveterate cases.

New London Med. and Phys. Journal, for Sep. 1812.

PHILADELPHIA DISPENSARY.

Managers Elected, January 1813.

William White, President;
Lawrence Seckel,
Robert Blackwell,
Henry Helmuth,
Robert Smith,
Godfrey Haga,
Robert Ralston,
Ebenezer Hazard,
Isaac Snowden,
Joseph Crukshank,
Elliston Perot.
Samuel P. Griffiths, Secretary.

Officers Elected, January 1813.

Attending Physicians and Surgeons.

Doctor Isaac Cleaver,
Henry Neill,
Samuel Stewart,
George S. Schott,
Joseph G. Shippen,
Joseph Woollens.

Consulting Physicians and Surgeons.

Doctor Benjamin Rush,
Thomas Parke,
Casper Wistar,
Philip S. Physick.

Treasurer.

John Clifford.

Apothecary.

George G. Tresse, at the Dispensary.

HUMANE SOCIETY.

Managers, &c. Elected, March 1813.

Joseph Crukshank, President;

Isaac Snowden, Secretary.

William Leedom, }
John Bacon, } Inspectors of the Apparatus.

Samuel P. Griffiths, }
Thomas C. James, } Committee of Correspondence.
Joseph Parrish, }

Charles Marshall,
Samuel Pancoast, Junr.
Benjamin Thaw,
Charles Penrose,
Matthew L. Bevan.
Joseph P. Hornor, Treasurer.

*The Officers of the American Philosophical Society
for the present year.*

President.

Thomas Jefferson.

Vice Presidents.

Robert Patterson,
Benjamin Smith Barton,
Caspar Wistar.

Secretaries.

Thomas C. James,
Thomas T. Hewson,
Nathaniel Chapman,
Robert M. Patterson.

Counsellors for three years.

William White,
Peter S. Duponçeau,
Jonathan Williams,
Horace Binney.

Counsellors for two years.

Nicholas Collin,
Benjamin Rush,
William Tilghman,
Andrew Ellicot.

Counsellors for one year.

Adam Seybert,
James Gibson,
John H. Brinton,
Edward Pennington.

Curators.

Robert Hare,
Zaccheus Collins,
John R. Smith.

Treasurer and Librarian.

John Vaughan.

FOR THE ECLECTIC REPERTORY.

Statement of Deaths, with the diseases and ages, in the City and Liberties of Philadelphia, from the 1st of January 1812, to the 1st of January 1813.

DISEASES.	Under 1 year	From 1 to 2	From 2 to 5	From 5 to 10	From 10 to 20	From 20 to 30	From 30 to 40	From 40 to 50	From 50 to 60	From 60 to 70	From 70 to 80	From 80 to 90	From 90 to 100	Total
Angina Pectoris -	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Asthma - - -	0	1	0	0	1	1	0	1	0	2	0	0	1	7
Abscess - - -	0	0	0	0	1	1	1	0	1	0	0	0	0	4
Aneurism - - -	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Apoplexy - - -	2	0	0	0	0	1	4	6	3	8	7	3	0	34
Atrophy - - -	5	3	2	0	0	0	3	1	1	1	1	0	0	17
Burns - - -	0	0	3	1	0	0	0	0	0	0	0	0	0	4
Cancer - - -	0	0	0	0	0	1	1	1	0	1	0	0	0	4
Casualties - - -	0	0	0	1	0	0	4	1	2	0	1	0	0	9
Diarrhœa - - -	13	3	0	0	0	0	0	0	0	0	0	1	0	17
Child Bed - - -	0	0	0	0	0	3	0	0	0	0	0	0	0	3
Cholera Morbus -	81	63	7	3	0	0	0	1	0	0	2	0	0	157
Cholic - - -	0	0	0	0	0	1	1	1	1	0	1	0	0	5
Consumption of the Lungs }	11	3	9	5	22	71	96	52	41	20	8	1	0	339
Convulsions - - -	139	10	9	1	4	5	3	2	2	2	0	0	0	177
Decay - - -	4	5	1	0	2	3	5	8	7	5	7	2	0	50
Diarrhœa - - -	2	3	2	0	1	4	3	2	1	1	1	0	0	20
Dropsy - - -	0	1	0	1	2	3	13	13	9	5	2	0	0	49
of the Breast - -	0	2	1	1	0	2	2	1	2	3	1	0	0	15
in the Brain - -	16	13	11	5	2	2	0	0	0	0	0	0	0	50
Drowned - - -	0	0	0	4	3	5	13	3	0	0	0	0	0	23
Dysentery - - -	9	6	1	2	1	2	2	1	0	0	0	0	1	24
Drunkenness - -	0	0	0	0	0	0	3	1	0	0	0	0	0	4
Diseases in knee joint	0	0	0	0	1	0	0	0	0	0	0	0	0	1
hip joint	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Debility - - -	9	6	2	1	1	1	6	7	5	1	5	1	0	45
Epilepsy - - -	0	0	0	0	0	0	1	2	0	1	0	0	0	4
Erysipelas - - -	2	0	1	0	1	0	0	0	0	0	0	0	0	4
Fracture - - -	0	0	0	0	1	1	0	0	0	0	0	1	0	3
Fever - - -	5	3	3	1	1	3	3	5	3	2	0	0	0	29
Intermittent - -	0	0	1	0	0	2	0	0	0	1	0	0	0	4
Remittent - - -	0	0	3	0	3	4	5	3	1	1	0	0	0	21
Bilious - - -	1	0	0	0	1	1	1	2	1	1	0	0	0	8
Nervous - - -	0	0	0	0	0	1	1	1	1	0	0	0	0	4
Malignant - - -	0	0	0	1	0	1	1	0	0	0	0	0	0	3
Typhus - - -	1	1	0	1	3	5	13	5	4	3	0	0	0	36
Puerperal - - -	0	0	0	0	0	1	2	1	0	0	0	0	0	4
Hectic - - -	0	0	2	0	1	0	1	0	0	0	0	1	0	5
Scarlet - - -	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Inflammatory - -	0	0	0	0	2	2	1	0	0	0	0	1	0	6
Mortification and Gangrene }	6	0	3	0	1	1	2	1	1	1	1	0	0	17
Gout - - -	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Gravel - - -	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Carried over,	307	123	61	30	55	128	192	122	88	61	38	11	2	1218

DISEASES.	Under 1 year	From 1 to 2	From 2 to 5	From 5 to 10	From 10 to 20	From 20 to 30	From 30 to 40	From 40 to 50	From 50 to 60	From 60 to 70	From 70 to 80	From 80 to 90	From 90 to 100	Total
<i>Brought forward,</i>	307	123	61	30	55	128	192	122	88	61	38	11	2	1218
Hooping Cough - -	8	8	6	2	0	0	0	0	0	0	0	0	0	24
Hives - - - -	11	4	4	1	0	0	0	0	0	0	0	0	0	20
Hernia - - - -	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Hæmorrhage - -	0	0	1	1	1	0	0	0	0	0	0	0	0	3
Hydrophobia - -	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Inflammation of the Brain	10	1	0	0	0	0	0	0	0	0	0	0	0	11
of the Lungs - -	1	1	1	0	0	0	1	0	0	0	0	0	0	4
of the Stomach -	18	5	1	3	2	0	4	1	1	0	1	0	0	36
of the Bowels - -	11	2	1	5	1	2	1	1	2	1	0	0	0	27
of the Liver - -	0	0	0	1	2	5	0	2	4	0	0	0	0	14
Insanity - - - -	0	0	0	0	0	1	10	14	0	4	1	0	0	30
Jaundice - - - -	0	0	0	1	0	0	0	1	0	1	0	0	0	3
Measles - - - -	6	8	3	3	0	0	0	0	0	0	0	0	0	20
Old Age - - - -	0	0	0	0	0	0	0	0	0	1	17	21	7	46
Pleurisy - - - -	7	3	3	1	4	8	12	10	9	9	2	1	1	70
Palsy - - - - -	0	0	0	0	0	1	3	1	2	4	11	1	0	23
Rheumatism - -	0	0	0	0	1	0	1	2	1	1	1	0	0	7
Scrofula - - - -	0	1	1	3	0	0	0	0	1	0	0	0	0	6
Sore Throat - -	9	1	3	1	0	0	1	0	0	0	0	0	0	15
Still Born - - -	142	0	0	0	0	0	0	0	0	0	0	0	0	142
Suicide - - - -	0	0	0	0	0	1	1	1	0	0	0	0	0	3
Sudden - - - -	1	0	0	1	1	5	12	8	3	0	1	0	0	32
Syphilis - - - -	0	0	0	0	0	4	1	0	0	0	0	0	0	5
Strangled - - -	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Teething - - - -	5	5	1	0	0	0	0	0	0	0	0	0	0	11
Ulcers - - - - -	0	0	0	0	1	0	1	0	1	0	0	0	0	3
Wounds - - - -	0	0	0	0	0	1	1	1	0	0	0	0	0	3
Worms - - - - -	0	3	6	0	1	0	0	0	0	0	0	0	0	10
Unknown - - - -	1	0	0	0	0	2	4	3	1	0	0	0	0	11
<i>Total,</i>	537	165	92	53	70	159	245	167	114	82	72	34	10	1800

NOTE. Of the above there were 505 males of twenty years and upwards, 419 under twenty years; of females 417, of twenty years and upwards, 381 under twenty years; and 78 children, principally under one year, whose sex is unknown.

It is farther to be noted that no returns have been received at this office since the 11th of July last, from the public burial Ground, at which time the City Commissioners took it into possession. However, it appears from the publication of deaths, by the Clerks and Sextons of the United Episcopal Churches of Christ, St. Peter and St. James, that there were interred since that period in the Public Burial Ground 359, which added to the above number will give a grand Total of 2159.

Deaths in each month of the above period.

	Adults.	Children.		Adults.	Children.
January - - - -	114	89	October - - - -	51	42
February - - - -	98	59	November - - - -	51	44
March - - - - -	87	63	December - - - -	36	28
April - - - - -	128	77			
May - - - - -	85	59	Total	915	885
June - - - - -	76	69			
July - - - - -	68	92			
August - - - - -	60	155			
September - - - -	59	108			

By order of the Board of Health,
JOHN ALLISON, Clerk.
Health Office, February 13th, 1813.

THE
ECLECTIC REPERTORY
AND
ANALYTICAL REVIEW.

VOL. III.

JULY, 1813.

No. IV.

SELECTED PAPERS.

Dissection of a Limb on which the operation for Popliteal Aneurism had been performed. By ASTLEY COOPER, Esq. F.R.S.
Surgeon to Guy's Hospital.

[From the Medico-Chirurgical Transactions, Vol. II.]

HAVING lately had an opportunity of dissecting the limb of a man who had a popliteal aneurism for which the operation of tying the femoral artery was performed seven years ago, and having injected and dissected the limb, I thought that a short account of the appearances, might not be deemed unworthy the Society's attention.

Independent of the gratification of curiosity in observing the mode by which the tributary streams supply the want of the chief channel of the blood, a knowledge of the exact course of the enlarged arteries will be useful in the after treatment of patients who have undergone the operation for aneurism, as it will teach the position least liable to compress the anastomosing vessels.

When this limb is examined, it will be seen that the arteries which form the new circulation are not only enlarged, but that they have also become *tortuous*. This change in figure is at

first the effect of an increased momentum of the blood in the anastomosing vessels which elongates them, and therefore prevents their lying in the same space as before, a circumstance that may be at all times seen on injecting arteries, that if the injection is much forced, the vessel becomes serpentine. But in the living artery this tortuous course is established by a new growth; for at the time that the vessel elongates and increases in diameter, its coats also become considerably thicker than natural: and thus it is kindly provided, that as the vessel enlarges, and the original matter of which it was formed is expanded over a larger surface, instead of the vessel becoming thinner, the increased determination of blood upon the artery occasions the deposit of additional matter in its coats, and its strength, as well as its length and diameter, are increased.

In enlarged veins, as well as arteries, this tortuous course may be observed. This limb will shew it with respect to the arteries, and with regard to veins, it will be well seen in a plate published by Dr. Baillie, in the work for the improvement of medical and surgical knowledge, in which a view is given of the vena azygos enlarged and tortuous from an obliteration of the vena cava inferior, and it may be at all times seen in varicose veins of the lower extremities.

This tortuous course of vessels will be also observed in the arteries of old persons, in whom the coats of the vessels are ossified; for in these cases, as the circulation is less assisted by the arteries of the part, the heart is called upon to make extraordinary efforts, by which the blood is sent with such momentum upon the aorta, as to increase its length and diameter, and render its course serpentine. It is in the aorta, before it forms its curvature in the abdominal aorta, and in the iliac arteries that this change is most conspicuous.

Any great increase in diameter of the anastomosing vessels is but slowly produced, for I have injected a limb several weeks after the operation for popliteal aneurism, without being able to force the injection through communicating vessels into the parts below. To enlarge the vessels much, it is necessary that the limb should have been employed in active exertion.

On account of the arteries not very readily enlarging, the limbs of those who have undergone the operation for aneurism

are for a considerable time weaker than natural. They feel the influence of cold more, are more disposed to ulcerate from slight causes, and when sores are produced, have diminished powers of restoration. On account of the languor of circulation and the diminished power of resisting the influence of low degrees of heat, it is right, after the operation for aneurism, to clothe that limb much warmer than the other; for which purpose, a piece of flannel or a fleecy stocking should be applied to prevent the sedative influence of cold.

A man who had undergone the operation for popliteal aneurism, complained in the evening of his leg being painful, and a dresser going through the ward, applied a lotion of the acetate of lead, and when the rags were removed on the following morning, the limb was found mortified.

Mr. Campbell, a patient of Mr. Curtis, surgeon in Whitechapel, underwent the operation for popliteal aneurism at a time when the weather was extremely cold. In three nights after the operation, he said his foot was benumbed, and when it was examined, it was found to be of a blue colour and quite cold. Frictions were immediately had recourse to; first with the hand only, and, after a time, with warm flannels, and the circulation was restored, although with considerable difficulty.

When a ligature has been applied, it is some time before the artery below becomes obliterated. Mr. Forster, surgeon of Guy's Hospital, has a drawing in his possession of a case of popliteal aneurism, for which the femoral artery was tied in August; the man died in January following, and when the limb was injected, the femoral artery, below where the ligature had been applied, was found to have received a part of the injection by communicating vessels.

It is for this reason that the pulsation in some aneurisms, where there are free communicating vessels, will remain for a considerable time after the operation. However, in twelve or fourteen months, when the femoral artery has been tied, it becomes obliterated, above the ligature to the *arteria profunda*, and below it, to the origin of the anterior tibial artery; and sometimes the remnant of the vessel is not only converted into a cord, but is ossified.

It is scarcely necessary to observe how improper it is to ap-

ply bandages upon limbs in which the principal artery has been tied; but I mention it because I have seen a roller used to confine dressings; on the same account it is required that attention should be paid to the position of the limb, to prevent any pressure being made by pillows, which may obstruct the course of the blood in its new channels.

Dissection of the Limb.

The femoral artery, which is necessarily obliterated by the ligature, was here converted into a cord from the origin of the *arteria profunda* down to the ham. The whole of the popliteal artery was also changed into a similar substance; and thus the natural channel of the blood from the groin to the lower part of the knee was entirely destroyed. The muscles, therefore, which usually receive blood vessels from the femoral artery, as the *sartorius*, the *rectus*, and the *vasti*, had no branches but from the *arteria profunda* and *circumflex* arteries; and the articular arteries from the popliteal, although they were still capable of receiving blood, derived it, not from the popliteal artery, but from the communicating vessels of the *profunda*.

The *arteria profunda* formed the new channel for the blood. Considerably enlarged in its diameter, although still not equal in size to the femoral artery at the groin, it took its usual course to the back of the thigh on the inner side of the thigh bone, and sent branches of a larger size than usual to the *flexor* muscles of the leg, and just midway on the back of the thigh it began to send off those arteries which became the support of the new circulation.

The first artery sent off passed down close to the back of the thigh bone, and entered the two superior articular branches of the popliteal artery, which vessels supply the upper part of the knee joint.

The second new large vessel arising from the *profunda* at the same part with the former, passed down by the inner side of the *biceps* muscle to an artery of the popliteal, which was distributed to the *gastrocnemius* muscle, whilst a third artery, dividing into several branches, passed down with the sciatic nerve behind the knee joint, and some of its branches united themselves with the inferior articular arteries of the popliteal,

with some recurrent branches of those arteries, with arteries passing to the gastrocnemii, and lastly, with the origin of the anterior and posterior tibial arteries: and these new large communicating branches were readily distinguished from others by their tortuous course.

It appears then, that it is those branches of the profunda which accompany the sciatic nerve, that are the principal supporters of the new circulation. They were five in number, besides the two deep seated arteries which do not accompany the nerve.

The external circumflex artery was considerably larger than usual for the supply of branches to the muscles on the fore part of the thigh, but it had no branches for the new circulation.

The obturator artery did not appear larger than usual, and although much pains were taken to trace any enlarged communicating branches between the ischiatic arteries and profunda, yet no vessels capable of receiving coarse injection could be found.

Anastomosis appears to be so free in all the arteries of the limbs and in the vessels of the head and neck, that there is no difficulty, with the precautions that I have mentioned, in the blood finding its course in new channels when the old are interrupted. If there is any exception to this statement, it is with regard to the subclavian artery. But experience is not yet sufficient to lead to a decisive judgment upon this point.

Mr. Ramsden has published an account of an operation on the subclavian artery, and the man does not appear to have died from want of anastomosis. Sir William Blizard has also lately tied this artery, and, as I understand, accomplished the operation with great ease; but the man was advanced in years, and much reduced in strength, and he died on the fourth day after it had been performed.

In other animals the blood may be diverted from its proper channels in all the external arteries of the body. The carotids, the femoral, and brachial arteries may be tied, and yet the life of the animal be preserved.

The preparations which I have now the honour of showing to the Society were made under the following circumstances.

I have been long in the habit of tying the carotid arteries in

the dog in my Surgical Lectures, for the purpose of shewing the falsehood of the prevailing idea that a ligature upon these arteries produces sleep or coma in the animal. In a healthy dog who had been the subject of this experiment, I made ligatures upon both the femoral arteries; and when these ligatures had separated, and the wounds had perfectly healed, I tied one brachial artery, and that wound having closed, the other brachial was cut down upon, and, as I supposed, divided and tied. The animal survived these different experiments, and lived above a year afterwards. Immediately after death it was injected, and the injection had passed so successfully in the neck, and in the thighs, as to make beautiful preparations of the anastomosing vessels. But the injection failed in one of the fore extremities, so as to leave a doubt whether the brachial artery had been divided, or the radial or ulnar under a high division of the brachial artery. This, however, is certain, that the animal lived for more than twelve months with the two carotids, the two femorals, and one brachial artery obliterated.

These experiments were made, not merely with a view to ascertain the extent of the anastomosing principle, but also for the purpose of learning if any change would be produced in the habits of the animal, in consequence of the blood circulating through new and numerous channels; for it has been observed by Mr. Carlisle that slow moving animals have such a circulation; but with regard to this dog, he remained equally lively and active as before.

Lastly, I was anxious to ascertain, when even the aorta was tied, if the blood would still find its course by anastomosis.

It is now more than two years ago that I opened the abdomen, by an incision of about three inches in length close to its junction with the loins, and turning aside the peritoneum with my finger, I felt the aorta pulsating, and passing a blunt hook under it, easily put a ligature around it.

During the last winter, assisted by my friends Mr. White and Mr. Dean, two of our most promising and intelligent pupils, I repeated the experiments, and have the honour of shewing to the Society the aorta tied and divided, the animal having survived the experiment, and maintained his usual health; the ligatures coming away as other ligatures upon ar-



Fig. 2.



Fig. 1.



teries, and a successful injection having been made of the body, the anastomosing vessels are beautifully seen. These were sufficiently large and numerous to allow of a free injection of the femoral vessels.

Some degree of weakness is produced in the hinder extremities by a ligature made upon the aorta; but it is not sufficient to prevent the animal from using them with great freedom, and would scarcely be observed by one who knew nothing of the experiment.

Previously to the animal being killed, the femoral artery and vein were laid bare; the blood in the artery was florid as usual, and passed with a motion that was pulsatory, although weaker than natural.

Explanation of the Plate.

Fig. 1. Anterior view of the limb.

a. Iliac artery.

b. Femoral artery.

cc. Obliterated femoral artery.

d. Profunda and circumflex arteries.

e. Sartorius muscle.

ff. Anterior tibial artery.

Fig. 2. Posterior view.

g. Gluteal artery.

h. Ischiatic artery.

ii. Arteria profunda.

k. The enlarged communicating branches between the profunda and posterior tibial artery, (*for the popliteal artery was obliterated.*)

l. Lower tibial artery.

m. Interosseal artery.

Case of Hydrophobia, successfully treated. By JOHN SHOOLBRED, M. D. of the Bengal Establishment; Surgeon to the Presidency, and to the Calcutta Native Hospital. First published in the Asiatic Mirror.

To the Editor of the Asiatic Mirror.

SIR,

I HAVE the satisfaction to inclose a case of recovery from hydrophobia, effected by blood-letting alone.

A newspaper, I am aware, is not the most appropriate vehicle for the communication of medical science; yet, as I consider the speedy and extensive promulgation of this case to be of the utmost importance to the lives of individuals, and being acquainted with no means by which that can be accomplished, so readily as through the medium of your paper, I trust you will not refuse me the favour of giving it a place in the ensuing number of the *Mirror*.—I am, sir, your most obedient servant,
JOHN SHOOLBRED.

Calcutta, May 18, 1812.

Tuesday, May 5, 1812.—About 3 P. M. Ameir, a Muselman Bhestie (water-carrier), from twenty-five to thirty years of age, and middle stature, in the service of Mr. John Wood, schoolmaster at Chowringhee, was brought to the Native Hospital, labouring under the most unequivocal symptoms of hydrophobia.

The note from Mr. Wood, requesting admission for this patient, and the friends who accompanied him, stated that he had been bitten in the leg about three weeks before, by a dog believed to be mad, and that the symptoms of his disease had appeared that morning, the fifth.

I visited him in the hospital, the moment of his arrival, and found him sitting on the side of a cot, with an attendant holding him by each arm. The first view was sufficient to satisfy me of the nature of his complaint. His body, arms, and throat were affected with constant and uncontrollable spasmodic startings. The muscles of his face were thrown into quick convulsive action at each inspiration, drawing back the angles of the

mouth, and at the same instant depressing the lower jaw, so as to communicate the most hideous expression to the countenance. His eyes appeared starting from their sockets and suffused with blood; sometimes fixed in a wild and terrific stare, at others, rolling about, as if they followed some ideal object of terror, from which he apprehended immediate danger. A viscid saliva flowed from his mouth, which was always open, except when the lips were momentarily brought together for the purpose of forcibly expelling the offensive secretion that adhered to them, and which he effected with that peculiar kind of noise, which has been often compared to the barking of a dog. His temples and throat were bedewed with clammy moisture. His respiration was exceedingly hurried, and might more properly be called panting than breathing; or it still more nearly resembled that short and interrupted kind of sobbing, that takes place when a person gradually descends into the cold bath. He was exceedingly impatient of restraint; and whenever he could get a hand disengaged, he immediately struck the pit of his stomach with it—pointing out that part as the seat of some undescribable uneasiness. From the constant agitation of his whole frame, and the startings of his arms, it was impossible to count his pulse with exactness; it was, however, very unequal, both in strength and frequency; at times scarcely perceptible, and then rising again under the finger; sometimes moderately slow and regular for a few pulsations, and immediately after so quick as not to be counted; but conveying, upon the whole, an idea of a greatly oppressed and impeded circulation. His skin was not hot; and though his head was in incessant motion, accompanied with such savage expression and contortion of countenance, as might easily have alarmed those unaccustomed to such appearances, he made no attempt to bite, which is far from being a frequent symptom of the disease; and when it does occur, must be considered merely as an act of impatience at being held, and, no more than the peculiar noise above noticed, as indicating any thing of the canine nature imparted by the bite, an opinion which has been sometimes fancifully but absurdly entertained.

When questioned concerning his own feelings or the cause of his illness, he was incapable of making any reply; being

prevented, it is probable, either by the hurried state of his respiration, or by his mind being too deeply absorbed in the contemplation of horrible ideas, to admit of his attending to the queries addressed to him.

I desired water to be offered to him; at the mention of which he started with increased horror and agitation, and endeavoured to disengage himself from those that held him. When one of the attendants approached with a cup of water, he looked at it wishfully, and after some efforts, with apparent reluctance stretched out his hand to take hold of it; but before he could reach the cup, his hand was suddenly drawn back by a convulsive motion; at the same instant, he turned away his head, and writhed himself round on the bed in an agony of terror and despair, wholly inconceivable by any person who has not been a witness of the horrors of this most dreadful, and hitherto, it may be added, most irremediable of human maladies.

Such was the state of the patient at the moment of his admission, and for the few minutes that necessarily elapsed while these appearances were passing under my observation.

Of the nature of the complaint there could not exist a shadow of doubt; and having so recently read in the Madras papers a case of hydrophobia successfully treated by Mr. Tymon, of his majesty's 22d dragoons, by bleeding, mercury, and opium, I determined on the immediate adoption of the same plan.

I therefore, without delay, opened a vein in the right arm by a large orifice, out of which the blood sprang with uncommon impetuosity, and of so florid a colour as to resemble arterial rather than venous blood. By the time that 16 or 20 ounces of blood had flowed, the spasmodic startings of his arms, body, and neck, had considerably diminished; his breathing had become more calm, with less contortion of countenance, and he audibly acknowledged, that the pain about the præcordia and region of the stomach was upon the decline. Encouraged by these incipient appearances of amendment, I allowed the flow of blood to continue, and when about two pints were taken away, seeing him greatly composed, I desired water to be again offered to him—when, equally to my astonishment and delight, he took the cup in his left hand, the blood still flowing

from the right arm, and calmly, but with undescribable expression of satisfaction, drank two or three ounces of water—the sight of which, but a few minutes before, had thrown him into the most dreadful agonies. Soon after swallowing the water, he retched three or four times, but ejected nothing but saliva from his mouth and fauces; and finding now that his pulse was 104, weak, soft, and regular,—that he was become faint,—and that all appearance of uneasiness had ceased, so as to allow him to take a second draught of water, about four ounces,—I closed the vein, and laid him down on the bed. At this moment he expressed a desire to have a natural alvine evacuation, and wished to go out of the hospital for that purpose; but as that could not be complied with, he took no more notice of it at this time. It is worthy of remark also, that during the bleeding, he made a sign to have himself fanned, a thing I never knew a patient in hydrophobia to do before; their distress being so uniformly increased by any current of air blowing upon them, that, according to all my experience, the dread of air in motion is as constant an attendant on the disease as the dread of water itself.

After the bleeding he remained perfectly quiet, and fell into a slumber for about an hour: another circumstance which also strongly marks the abolition of the disease, as no hydrophobic patient was ever known to sleep. When he awoke, he expressed a wish to have some sherbet, which was immediately given to him, and he drank four ounces of it with perfect ease. He then fell into another slumber, during which some convulsive startings were again perceptible about his arms, chest, and face, but not strong enough to wake him. At a quarter past five he spontaneously awoke, and appeared again somewhat agitated, with more suspicion in his looks, and of apparent doubt whether he could swallow as well as before; for when he took the cup, he put it to his lips with a quick motion, and gulped down about four ounces of water in a hurried manner, as if afraid that the difficulty of swallowing would be increased by a moment's delay. He also put his hand to the region of the stomach, and said that the pain in that part was returning. These threatening appearances of relapse determined me to hazard a further detraction of blood. I therefore immediately opened a vein in

the left arm, and allowed the blood to flow again till he completely fainted; but previous to this effect of the bleeding, the pain at the stomach had ceased; and while the blood was yet flowing he had again drank four ounces of water without fear or disgust. When he recovered from the fainting fit, he retched several times, but, as before, discharged nothing but saliva.

At the end of the first bleeding, his pulse was 104; immediately before the second, it was 96, with a slight degree of sharpness in the beat; and after recovering from the fainting occasioned by the second bleeding, it was 88, regular, soft, and feeble, and he now complained of nothing but extreme weakness, and giddiness of the head. And at this stage of the case, I apprehend, it will be allowed that the cure of the hydrophobia was complete—whether it would be permanent or not, remained yet to be seen.

When I began the treatment of this patient, it was my intention, as I have said, to follow in every circumstance the practice pursued in Mr. Tymon's successful case; and accordingly, a draught with 100 drops of tincture of opium, and an enema of 300, were in readiness to be administered immediately after the bleeding. But seeing the surprising effects of the bleeding alone, and feeling convinced that the disease was, for the present at least, completely annihilated by the copiousness of that evacuation, I determined to preserve the treatment as simple as possible, in order that, if the patient did finally recover, it might with certainty be known to what he owed his safety; and that thence the application of the same practice to future cases of hydrophobia might with the greater confidence be recommended: a resolution in which I was the more confirmed from having heard some medical friends, whose opinions are entitled to every degree of respect, ascribe Mr. Tymon's success to the mercury he had used, rather than to the bleeding.

I am now fully persuaded, however, that I might safely, as far as the hydrophobia was concerned, have omitted all remedies after the bleeding; but thinking that calomel and opium, in repeated doses, were more likely than any thing else to induce that state of the system which would be least favourable to

a relapse; and also that if the patient, notwithstanding his present promising appearance, did not finally recover, it would certainly be said that I had not given him a fair chance, by departing, in any particular, from the treatment which had proved so successful in the hands of Mr. Tymon, I was led to conform to it so far, as to order four grains of calomel and one grain of opium to be given every three hours.

The first pill was taken at a quarter before six; but it was immediately rejected, followed by some water. A second was given five minutes before six, and remained. He now slept till seven, then drank some more water, and had a natural evacuation of his bowels: another circumstance which confirmed me in the belief that the disease was completely and permanently subdued,—having never before seen or read in any history of the disease, of such an occurrence as a natural action of the alimentary canal, in a case of hydrophobia.

At nine he took another pill, and again at twelve, and continued to slumber and drink water as often as he pleased.

Wednesday, May 6th—(2d day) 6 A. M. Has passed the night well. Took a pill at three, and another now. Has drunk water frequently. Pulse 84. Skin cool. Tongue clean at the edges; some remain of betel, eaten before he was taken ill, covered the center part. Two more alvine evacuations during the night. Complains of headache, but is entirely free from uneasiness about the stomach.

On examining the blood drawn yesterday, the surface of the coagulum is found not to be in the least concave, neither does it exhibit the slightest appearance of what is called the buffy coat. The quantity first drawn, making allowance for the evaporation of the night, measures 40 ounces; and the last between seven and eight.

Nine A. M.—Took another pill, which was followed by another evacuation; and, in half an hour afterwards, he ate eight ounces of sago. Is quite composed, and can answer questions distinctly concerning the accident and subsequent occurrences, till the time he was taken ill.

He says that nineteen days ago (including this day) when returning about four in the afternoon, from his own house at

Russapulagh, to his master's at Chouringhee, he saw a Pariah dog seize a fisherman, and bite him. Several people were collected at the spot; he also approached, when the same dog ran at him, and, as he was retreating before him, bit him in the back part of the right leg, about six inches above the ankle, where he shews two scars at the distance of an inch and a half from each other, but without any appearance of inflammation or thickening of the integuments. The dog, after biting him, disappeared, and he does not know what became of him or of the fisherman. The wounds bled a good deal, but not being very deep, they soon healed, without any application. He took no remedy, except, on the day he was bitten, a small piece of scarlet cloth (*sooltanee banat*) wrapt up in a piece of ripe plantain, which was recommended to him as an infallible antidote against infection from the bite of a mad dog. He never saw any one in hydrophobia, and though he had heard that persons bitten by a mad dog were liable to such a disease, the apprehension of it never dwelt on his mind, or scarcely ever occurred to him after the day on which he was bitten. He continued in his usual health till the 4th instant, seventeen days after the bite, when he found himself dull, heavy, and listless, with loss of appetite, and frequent apprehension that dogs, cats, and jackalls, were about to seize upon him. He also felt a pricking sensation in the part bitten. When his mother-in-law brought him his breakfast, he was afraid to eat it. He continued his business, however, of taking water from the tank to the house, till about noon of that day, after which he could not bear to look on, or to touch the water, being constantly harassed, whenever he attempted to do so, with the horrible appearance of different animals ready to devour him. He now, for the first time, thought of the disease arising from the bite of a mad dog, was convinced that was the cause of his present distress, and fully believed he should die of it. He ate no supper, nor drank any water that night, in consequence of the horrible phantoms that incessantly haunted his imagination. In the morning all his horrors were increased; the spasms came on, accompanied by anxiety, oppression, and pain about the præcordia and stomach: and those about him say that he continued to get worse in every respect, until he arrived at the hospital in the state al-

ready described. He does not himself distinctly remember any thing that happened during the whole day. He has some faint recollection of having been at his own house; but how he got there—when he left it—or by what means he was brought to the hospital, he does not at all know. The first thing he can recal to his mind is drinking the sherbet—and he says he has had his senses perfectly since that time—and that all his fears then left him, and have not since returned. This, however, is not entirely correct, as he acknowledges that he does not recollect the second bleeding, which shows that the disease had then so far returned as again to disorder his mental faculties.

Half past 10 A. M.—Complains of severe head-ache, and his eyes are more suffused than they were in the morning. No return of other symptoms.

Head shaved, and six leeches applied to each temple.

Three P. M.—Took a pill at 12, and another just now. Leeches bled freely. Head-ache relieved. Took eight ounces more of sago about noon.

Six P. M.—The same. Has now taken 28 grs. of calomel and 7 of opium. To take from this time only 2 grs. of calomel, and half a grain of opium every three hours.

Nine P. M.—Has slept for two hours. Pulse 80. Took another of the pills last ordered, also some more sago. Copious bilious evacuation. Still complains of giddiness, but not head-ache.

Thursday, the 7th, (third day,) 6 A. M.—Took a pill at 12, but refused one at 3, saying his mouth was sore. Took one now. Has been rather restless in the night. Threw up some bile this morning.

Ten A. M.—Exceedingly distressed by excessive secretion of bile, which he is frequently throwing up and also passing downwards in great quantity, and of a dark-green colour. Pulse 110. Some heat of skin; expression of uneasiness in his countenance—burning sensation all over the abdomen; but quite different, he says, from the former pain about the stomach. He was ordered a pint of infusion of camomile, which brought off much bile; at 11, eight grains of calomel, and at half past 12, half a drachm each of jalap and magnesia. By the effects of these remedies, he was much relieved in the evening; though

the complaint continued to disturb him in the night, and it was necessary, on

Friday morning, the 8th, (fourth day) to promote the farther evacuation of bile by senna, manna, and cream of tartar, and to order an enema of conjee to allay local irritation. Pulse only 80, soft. Burning removed from the abdomen. Ate a water melon in the night. Copious flow of saliva from his mouth.

Saturday, 9th, (fifth day) 9 A. M.—Has passed a good night. Excessive secretion of bile has ceased. Clamorous for food, but I allow him only rice and sago; declines milk. He appears now to be free from all complaint. After this time nothing remarkable occurred. He had a strong appetite, and was allowed vegetable curry. For several evenings some heat of skin and acceleration of pulse were perceptible; but these soon went off from cold bathing, and a constant attention to keep his bowels in an open state.

Monday, May 18th, (fourteenth day).—Has been for some days past on the usual hospital diet; and feeling himself well in every respect, now expresses a wish to be discharged and return to his usual business, but, as the weather is exceedingly hot, (thermometer in the shade from 95° to 100°,) I have prevailed upon him to continue in the hospital till the setting in of the rains. I shall then, if possible, persuade him to remain in my own employment for the next twelve months, lest, if he were discharged, and should happen to die, of whatever disease, it might be alleged that he was, after all, carried off by a relapse of the hydrophobia.

REMARKS.

On hearing that a recovery from hydrophobia has been effected in the short space of two hours, by the single remedy of blood-letting, a doubt may probably occur to a person acquainted with the previous history of this formidable malady, and the nearly uniform failure of all attempts hitherto made for its cure, whether the disease now said to be cured was in reality a genuine case of hydrophobia, produced by the bite of a rabid animal. I admit the scepticism to be reasonable; for in the relation of a case, which has terminated so differently from all others yet on record, (not even excepting the case so suc-

cessfully treated by Mr. Tymon,) it is natural to suspect either some misconception or misrepresentation of facts, or some fallacy in the deductions derived from them.

An attentive perusal of the preceding narrative will, it is presumed, remove these doubts from the minds of the majority of readers; yet, as some individuals may not be convinced by that evidence, which, to others, appears full and satisfactory, and, as it is a matter of the utmost importance to future sufferers from hydrophobia, that no doubt should be allowed to remain, either as to the existence of the disease itself, in the case above related, or that the bleeding was the sole remedy, I shall, as briefly as possible, endeavour to establish the certainty of both those facts, beyond the possibility of contradiction.

To a person who has never seen a case of hydrophobia, I acknowledge the difficulty, nay, almost the impossibility, of conveying by words an adequate notion of the disease. The horrors of that state must be seen to be fully conceived; but being once seen by a medical observer of any discernment, they are indelibly fixed in the mind; and I contend that it would then be highly improbable that he should ever mistake any other disease for hydrophobia; or take hydrophobia for any of those affections to which it has been said to bear some resemblance; so deep and so permanent, I am convinced, would be the impression left on his mind by the contemplation of even a single case of hydrophobia. But when I state that my situation as surgeon to the Calcutta Native Hospital, for the last eighteen years, has afforded me opportunities of seeing the disease, which have fallen to the lot of few individuals in any country, and that no less than seventeen or eighteen cases of it have come under my observation within that period, in all of which both my diagnosis and prognosis (with the single exception of the latter in the case under consideration) have unhappily been but too fatally verified, it is not, I trust, laying claim to too great a share of discernment to assert, that I could not easily be mistaken in a case of hydrophobia; and that I should consider my being so as unlikely, as that an experienced surgeon should ever confound two diseases the most opposite in their nature; because, to an uninformed eye, they might both exhibit something of the same external appearance.

Farther, it has been usual with me, on the admission of a case of hydrophobia into the hospital, to send for some of my medical friends, not only that they might see a disease seldom occurring in private practice, but that I might have the benefit of their suggestions in regard to the treatment. On the present occasion, the promptitude necessary to the practice I had determined to adopt in the first case that occurred, and its astonishing effect in so suddenly and effectually subduing the disease, deprived me of the advantage I should now have derived in establishing the point in question, from the concurring testimony of a judicious medical friend. But though not permitted to give direct evidence as to the existence of the disease in the case above detailed, these gentlemen can yet vouch, that they were never called by me to see a case of hydrophobia in which there existed the slightest doubt of the nature of the disease; and it will hardly be contended that I was more liable to mistake it in this case, than on any former occasion.

If these facts and reasonings, combined with the account of the accident; the time that elapsed before the appearance of the symptoms; the statement given by the patient of the commencement of the disease; and by his friends, as to the state in which he appeared before he was brought to the hospital; the symptoms under which he laboured when he arrived there; should all be deemed insufficient to establish the real nature of the disease, I confess myself at a loss to conjecture what species of proof would be necessary for that purpose. The only defective point in the evidence appears to be our ignorance whether the dog by which Amier was bitten was actually mad or not; and though this cannot be proved by direct testimony, yet as it is known that the disease was prevalent among dogs, about that time, as will be hereafter noticed, it is presumed that this is an objection of very little weight. If, therefore, any individual, after duly considering all these circumstances, still continues in doubt as to the nature of the disease, may it not, in conclusion, be permitted to ask him what disease it was, if not hydrophobia.

That the disease, whatever it might be, was removed, and that almost instantaneously, by bleeding alone, admits, in my mind, of equally little doubt.

In Mr. Tymon's successful case, the symptoms only gradually disappeared, some of them remaining so late as the fourth day, and as opium, mercury, and antimony, had been largely used during the whole time, and the patient's system was evidently under the influence of the mercury, before he could be said to be free from the disease, an opinion might still be entertained, and actually was so, by many with whom I have conversed on the subject, that the cure was, after all, effected by the mercury, and not by the bleeding.

Dr. Berry himself, to whose rare and laudable zeal for the promotion of useful science, even at the period of closing a long and honourable career of public service, the world is indebted for the knowledge of Mr. Tymon's unprecedented case of success, alleges that the bleeding "saved Mason's life, by diminishing violent action, and admitting the effect of medicines that in all former experience had uniformly failed."

As this notion too corresponds with the most prevailing theory of the disease, though that theory has not in a single instance been verified by the success of the practice to which it gave rise, I consider it of great importance to correct it; lest, by still expecting some good from mercury and opium in hydrophobia, the attention of the physician should be diverted from a sufficient abstraction of blood,—on which, and on which alone, as far as a single case can prove any thing, the life of the patient seems entirely to depend.

That the first bleeding in the case above related, wholly, though not permanently, removed every symptom of the disease, was proved, I presume, in the most ample manner, by the following six remarkable circumstances: 1st, the removal of the spasms; 2d, the freedom of respiration; 3d, the restoration of the power of swallowing fluids, and the absence of horror at their approach; 4th, the desire, instead of the abhorrence of a current of air; 5th, the inclination for a natural alvine evacuation; and 6th, the power of sleeping. All these unequivocal indications of recovery took place during, or immediately after the first bleeding; and as none of them ever happened before to a patient in hydrophobia, except near the close of the melancholy scene, when they denote an entire sinking of the powers of life, rather than the cessation of disease, it seems but

fair to ascribe them to a remedy, which had never before been used as it was on this occasion, or, if so, unluckily not at the time when it was capable of doing good.

When a recurrence of the disease was threatened in two hours afterwards, the power of the remedy was again conspicuously manifested, and a second bleeding *ad deliquium* instantly stopped the progress of the symptoms, and before a single particle of medicine of any kind had been given, permanently extinguished the morbid condition, whatever it may be, in which the essence of the disease consists.

These two points, therefore, appear to be fully proved, namely, that the disease was hydrophobia, and that the cure consisted in blood-letting alone.

But notwithstanding this unprecedented success, I am not so sanguine as to believe that venesection will cure every case of hydrophobia. It is probable that there is a period in the disease beyond which its curative effect cannot extend. What that period is, cannot be known without a more enlarged experience. But this very uncertainty affords only a more powerful reason for losing no time, in resorting to the copious abstraction of blood, upon the very first appearance of unequivocal symptoms of the disease, as the delay of only a few hours may prove fatal to the patient.

In referring to notes which I have preserved of fourteen cases of hydrophobia, I find that eight of the patients died within six hours after admission. In these I cannot believe that bleeding would have done any good. But of the remaining six who lived respectively 11, 13, 15, 20, 36, and 49 hours after admission, it is certainly reasonable to believe that it might have saved three or four. In a case so entirely hopeless, however, there could scarcely be harm to the individual, from trying it at any period of the disease. And as it is only by such trials that the real limits of its power can ever be ascertained to any useful purpose, it is rather desirable than otherwise, that they should be made. One disadvantage, however, eventually arising from such trials, requires to be guarded against. The medical profession, taught by innumerable disappointments, admit very cautiously the claims of any new mode of practice to general adoption. If several patients in hydrophobia, therefore,

should happen to be bled in an advanced stage of the disease, and die,—as they inevitably would do whether they had been bled or not—such cases would be quoted against the new practice as failures, and might tend so far to bring the remedy into discredit, as to prevent its being used, even in cases where it might have proved the certain means of saving life.

I am the more desirous of noticing the unfavourable effect upon the adoption of the new practice, which may eventually arise from bleeding at too late a period of the disease, and of entering a strong caution against the hasty rejection of the remedy from such instances of failure, in consequence of the circumstance having very nearly happened to myself, only three days before the occurrence of the case of Amier.

On Saturday evening, the second of May, 1812, a native of Arracan, employed in Calcutta as a cook, was brought to the hospital, labouring under symptoms of hydrophobia. I went to him that moment, with the full determination of putting in practice the plan that had succeeded in the hands of Mr. Tymon; but I found that the unfortunate sufferer had been ill, according to the account of his friends, for fifty-six hours. His pulse was imperceptible—his skin cold, and his features sunk. I therefore got him to swallow one hundred drops of laudanum, which he effected, as frequently happens, with greater ease than is usual in an earlier stage of the disease; and ordered an enema with three hundred drops. The patient was dead in half an hour. Now what I wish to impress upon the mind of the reader is—that if, in this case, the disease had been somewhat less advanced—the pulse still perceptible, and the strength less sunk, I should certainly have bled the patient;—which, at such a period, could scarcely have prevented death. It would more probably have appeared to have accelerated that event; and, if so, might consequently have had the effect of preventing my pushing the bleeding in the case of Amier to the extent necessary to the cure. I must therefore here insist, that numerous failures in an advanced stage of the disease, will form no just ground for the rejection of a remedy, which has been so incontestably proved to have cured the disease when used at an earlier period. As well might the practitioner reject bleeding in the commencement of peripneumony

or enteritis in a robust athletic patient, because in each disease there is a period after which the detraction of blood, so far from curing, serves only to hasten the fatal event.

Nothing, however, can fix the real value of the remedy but experience. It is highly desirable that this may be speedily obtained; and as the disease does, and must very frequently occur in this country, whether we possess the means of curing it or not, we cannot doubt that but a very short time will elapse without further trials of this practice; and it may be presumed that the medical practitioners, who are so widely distributed throughout India, will fairly and circumstantially communicate to the public the result of their experience, whether attended with success or not.

It may be necessary to observe, however, that merely opening a vein and drawing a considerable quantity of blood is *not* the practice. The vein must be opened by a large orifice, the blood quickly evacuated, and allowed to flow, without regard to measurement, *ad animi deliquium*. Nothing less than this is capable of at once arresting the progress of the disease, relieving the spasmodic affection of the heart and arteries, suppressing excessive sensibility and irritability; and, in short, of admitting the restoration of that due balance of action and influence both in the circulating and nervous systems, on which the continuance of life and health seems to depend.

But I lay no stress on this or any other pathology of the disease. Well authenticated trials of the remedy in an early stage of it are what I desire to see. If it fails in many of these, when used in the manner above proposed, within twenty-four, or, to speak with more latitude, thirty hours, of the commencement of the symptoms, I confess I shall feel much disappointed; and not a little mortified, to be obliged, after such fair prospects, to reject a remedy, which has effected twice, in the short space of seven months, what was scarcely ever effected before; and to class it with that useless farrago of remedies and practices, which, though used hundreds of times, and for a series of ages, have never once been known to accomplish a cure of hydrophobia.

With respect to the subsequent treatment of the patient, it is scarcely necessary to make any remark. The case clearly

shows that for the hydrophobia no subsequent treatment was required. But as this and many other cases on record, shew a great disposition to disordered and excessive action of the liver, it may perhaps hereafter be found useful to administer mercury, both as an evacuant, and to the extent of affecting the mouth, with or without opium, according to circumstances.

It is usual, when new and successful expedients are first promulgated, to wonder why they never were thought of before. In conformity to this habit, I have frequently, within the last ten days, been asked why, in a disease so often proved incurable by other means, bleeding was not before tried? The fact is, however, that *bleeding has often been tried*. But owing, probably, to the evacuation not being pushed far enough, when used in an early stage of the disease—or to the period for its beneficial employment having elapsed, before it was resorted to, the relation of the cases in which it was used afforded little or no encouragement to farther trials; while the theory that has prevailed for nearly a century in regard to the nature of the affection, and its classification with diseases of the nervous kind, accompanied by great debility, tended directly to discourage all lowering plans of cure, and to point out antispasmodics and tonics as the only resource in hydrophobia.

Dr. Mead, who was very confident that he had found an infallible preventive of the disease, in a *little liverwort and black pepper*, aided by bleeding and cold bathing before the commencement of the course of medicine, says, “As to all other ways of curing the hydrophobia, I own I have not been so happy as to find any success from the many I have tried. Bathing at this time is ineffectual. *I have taken away large quantities of blood; have given opiates, volatile salt, &c. &c. &c.*—All has been in vain, *because too late.*” Notwithstanding his disappointment, he still concludes, “If any relief could be expected in this desperate state, I think it would be from *large bleeding even ad animi deliquium, before the fibres of the membranes have lost their natural force by convulsions.* But after all it will generally happen, that (as the Greeks said upon deplorable cases) ‘Death will be the physician that cures.’” This, though a recommendation, was certainly no great encouragement to blood-letting.

The doctrines of Boerhaave also led him and his pupils to recommend and practice blood-letting in hydrophobia. The celebrated Leyden Professor says, "The distemper is to be treated as one highly inflammatory, upon the first appearance of the signs which denote its invasion, by blood-letting from a large orifice, continued till the patient faints away; and soon after by enemata of warm water and vinegar," &c. &c. and he adds, "that this practice is supported by some small number of trials." But the particulars of this successful practice are not given.

I find, however, a trial of it at Edinburgh, more than sixty years ago, by the late Dr. Rutherford, a pupil of Boerhaave's, who took away *gradually* sixty-six ounces of blood from a patient, who had already been bled the same morning. As this patient lived forty-eight hours after the large bleeding, it is probable that it was used somewhat early in the disease, and should therefore, it may be said, have succeeded. Why it did not, it is impossible now to tell, unless the word *gradually* may be thought to afford some explanation; but I am persuaded the circumstances attending its failure had great weight in deterring others from pursuing the plan recommended by Boerhaave; and in giving an entirely different direction to the practical views of physicians, on the subject of hydrophobia.

On the failure of bleeding in this case, Dr. Rutherford, who then, with great reputation, filled the practical chair of the most celebrated school of medicine in Europe,—candidly retracted an opinion, which he had learned from Boerhaave, and which had directed the measures he took. He declared in his public lectures, that "he was convinced now, that the hydrophobia is spasmodic and not a high inflammatory disease. That though bleeding may be useful in preventing furiousness, neither that nor the proper antiphlogistic method are to be depended upon as the proper cure of hydrophobia; that in such cases, after bleeding once or twice, he would order *sal succini*, *musk*, opium, and perhaps *blisters*:"—Thus, at once sending abroad into all parts of the world the opinion that large bleeding was useless in hydrophobia, and inculcating the use of antispasmodics only.

Dr. Cullen says scarcely any thing on hydrophobia, farther

than that his chief reliance would be on mercury. Macbride asserts that "Doctor Nugent was the first that pointed out the true nature of hydrophobia—which before his time was generally considered as an inflammatory disease. Dr. Nugent's patient was *largely blooded*, and took, moreover, large quantities of musk and cinnabar as well as opium; and, towards the close of the cure, opium was given along with camphor, musk, and assafœtida. *But the opium is what we are chiefly to rely on.*"—Thus again withdrawing the attention of the practitioner from the large abstraction of blood, to which the cure in this case was most probably to be ascribed.

It is needless to multiply quotations to prove, that nearly the same opinion of the disease, and the remedies most applicable to it, have prevailed, with little variation, up to this day, with the single exception perhaps of Dr. Rush, who, in consequence of his peculiar notions about inflammation, but which do not seem to be countenanced by the appearance of the blood drawn from hydrophobic patients, again inculcated the necessity of blood-letting. Recent experience proves, that he was right. But it is to be regretted, that neither the cases to which he refers for the success of the practice, nor his amended hypothesis of the resemblance of hydrophobia to malignant fever, were considered of sufficient weight to encourage its adoption by other practitioners.

Finding therefore so many authorities against bleeding in hydrophobia, and not a single cure fairly ascribed to it, for no dependence can be placed on those vaguely mentioned by Boerhaave, it is by no means surprising that it should, for more than half a century, scarcely ever have been thought of as a remedy in this disease. I am aware that it has sometimes been used as an auxiliary, when the pulse has been full and the strength great, in order to render the patient more manageable. But as it has till lately never been employed as the remedy of sole dependence, nor applied in the manner necessary to produce a decided effect upon the disease, I confidently trust that its failure, nearly up to the present day, will not be considered as militating against the expectation of success, which I think we are now fairly entitled to entertain from its future employment.

It is at any rate highly encouraging to know, that, in the only three cases in which it has been trusted to as the principal or the sole remedy, it has succeeded to our utmost wishes.

The first case is that by Dr. Burton in America, which was suggested by Dr. Rush's lectures, and was published about seven years ago, in different periodical works. But unfortunately, in consequence of the case not being very accurately related, and its being combined with some fanciful theory, it does not appear to have been acknowledged as a clear instance of hydrophobia; and the benefit which might otherwise have been derived from it, was wholly lost to the world. Whether it was actually a case of hydrophobia or not is not now worth disputing, being in possession of Mr. Tymon's case, and of that which has given rise to these already too greatly extended remarks.

I cannot, however, conclude without saying a few words on the practices which have been principally in use up to this time. Never having seen Dr. Nugent's case,—the only instance of apparently authenticated recovery from hydrophobia with which I was acquainted, previous to these three,—is one related by Dr. Shadwell, in the *Memoirs of the London Medical Society*, in which, on the authority of a Greek Manuscript, oil was used both externally and internally. Relying on this example, I gave oil a very fair trial in several of the first cases that fell under my care. But, although I often got the patient to swallow a considerable quantity of it, and applied it frequently by enema, as well as to the skin by almost incessant frictions, it never appeared to do the least good. I therefore abandoned it.

I have subsequently used every mode of treatment that I have ever heard or seen suggested, with equally little success, except arsenic, which, though with no better hope, was to have been my next trial, had not Mr. Tymon's case fortunately occurred, to point out the practice which has already so well justified the confidence reposed in it.

On those occasions, besides the full trial given to oil, I used opium to a great extent in every possible way; mercury, musk, camphor, blisters, galvanism, and enemata of laudanum, and infusion of tobacco, all to no purpose. Nothing ever alleviated

a symptom except the two last, which certainly did lessen the spasms; and therefore, when bleeding may hereafter be used too late to succeed, I would recommend them as remedies, capable, though not of preventing death, yet of allowing the fatal event to take place with less suffering to the unhappy patient than any thing else with which I am acquainted.

On the recommendation of Dr. Bardsley of Manchester, a gentleman who has, with unwearied zeal, endeavoured to investigate the nature of hydrophobia, with a view to the discovery of its cure, and even to the extermination of the disease from the United Kingdom, I also gave a very fair trial to volatile alkali. Contrary to all expectation, I succeeded in getting into the stomach no less than three drachms of carbonate of ammonia, made into bolusses with crumb of bread. But the event was unhappily just the same as in all former cases.

Dr. Bardsley was led to this suggestion by the perusal of Mr. Williams's case of recovery from the bite of the *Cobra de Capello*, by means of *Eau de-luce*, and he endeavours to recommend its adoption by the following observation: "Surely, in the treatment of so fatal a disease as canine madness, it is proper to adopt any method of cure founded on RATIONAL PRINCIPLES. *Analogy, under these circumstances, seems to be our surest guide.*"

It is melancholy to relate, that though hydrophobia has been unusually frequent in England of late years, and many cases of it have been treated by the most eminent practitioners in London, both in hospitals and private practice, yet not a single case of recovery is recorded.

Dr. Parr, author of the Medical Dictionary, published for the express purpose of exhibiting the state of medical science up to the present time, after telling that every thing has been tried, and that every thing has failed in effecting a cure, consoles his reader by acquainting him with the infallibility of cutting out the part as a preventive, adding emphatically in *Italics*: "*In short, full, effectual, and COMPLETE EXCISION of the wounded part, is the only certain means of relief; AND THIS IS CERTAIN.*" But still leaving us in the same hopeless condition as to any means of cure after the disease has actually taken place.

Doctor John Hunter concludes a most able paper on the history of the disease, and the trials made for its cure, with these words: "After the symptoms of hydrophobia have appeared, no medicine or remedy that has hitherto been used, has relieved, much less cured the disease." And finally,

A well-informed anonymous writer, in the Medical Annual Register for 1808, after presenting a sketch of the practice that had been pursued in London during that year, and noticing the failure of every expedient, sums up his history with this opprobrious sentence. "On the whole, therefore, we may be considered as remaining in the most entire ignorance, both of the nature of the disease, and of the method of cure, or even of palliating a single symptom."

Such was the disheartening language universally held on the subject of hydrophobia. I humbly trust that it can be held no longer. That the case above related, coming so soon after that of Mr. Tymon, entitles us to indulge more animating views for the future; and that it will not be long before additional experience shall serve to confirm the hope, which seems now to rest on so promising a foundation, that a remedy has at length been discovered for this hitherto uncontrollable disease.

It is mortifying to the pride of science to acknowledge it,—but if farther trials of bleeding *aa deliquium* shall confirm its power of curing hydrophobia when used early in the disease,—it is nevertheless impossible to conceal, that this *solum et unicum remedium* has apparently been hitherto overlooked, in consequence of an overweening fondness for system, which led medical writers to class hydrophobia with diseases of the nervous kind, and to dwell particularly on its resemblance to tetanus. That disease being considered as highly asthenic, blood-letting, perhaps without sufficient reason, has been thought inadmissible. Antispasmodics and tonics have been employed in all quantities and forms, and though by such remedies scarcely one case of tetanus in fifty has ever been cured, the same treatment has been rather preposterously, it should seem, transferred to hydrophobia,—because, under such hopeless circumstances, *analogy has been said to be our surest guide*. Whither has it guided us? Never certainly to a single cure of hydrophobia. It may, perhaps, with greater truth be said to have

been an *ignis fatuus*, which has served to lead us into difficulties and dangers, rather than to conduct us into the salutary path of curative science; and that, perhaps, in more diseases than the one under immediate consideration.

After expressing so little respect for analogy, the professed guide of physicians, in the treatment of hydrophobia, shall I not be accused of inconsistency, or of indulging in notions of too speculative a nature, if I offer a hint that some use may be derived from favourite analogy, by pursuing it in an opposite direction? and instead of applying to hydrophobia the treatment which seldom succeeded even in tetanus itself, we now transfer to tetanus, and perhaps to other diseases of the same kind, the practice which has been incontestably proved, in two instances at least, if not in three, to have been successfully employed in hydrophobia.

Almost all authors have spoken of this analogy, and some have gone so far as to affirm, that tetanus may be easily mistaken for hydrophobia. I confess myself to be of a different opinion; being fully persuaded that no person, who has often seen both diseases, could ever mistake the one for the other, and that for the following reasons: First, in tetanus the lower jaw is immovably fixed, and the patient speaks by the motion of his lips only, with a hissing kind of noise,—whereas in hydrophobia, the lower jaw is movable to any degree; and is, in fact, in the exacerbations, almost in perpetual motion, often resembling the action of hawking or retching, for the purpose of bringing forward and expelling the viscid saliva, which constantly collects about the fauces. And, in the second place, that though the swallowing of fluids may be difficult or impossible in tetanus, and the attempt even accompanied with convulsions of the face, throat, and chest, yet the obstacle is confined to the actions connected with deglutition alone; and the name, the approach, and the touch of fluids have never, in my experience, thrown the patient into the agony of horror, distress, and despair, which is invariably witnessed in hydrophobia.

Some Observations on Spina Bifida.

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[From the Medico-Chirurgical Transactions, Vol. II.]

I PROBABLY should not have read to the Society the following remarks on Spina Bifida at the present time, had not I been urged to it by those on whose judgment and friendship I have been accustomed to rely. The cases which form the basis of this paper having been shewn to Drs. Marcet, Yelloly, and Farre; to Mr. George Young, and to Mr. Barlow of Blackburn; they were of opinion that they not only deserved publication, but strongly urged that they ought not in justice to remain concealed, as there were, probably, many children at this time in the kingdom who labour under the disease in a state to admit of remedy, and whose lives might fall a sacrifice to withholding this communication from the public. Nor will it, I trust, be considered that I am publishing precipitately, by those who will give themselves the trouble to visit the cases which I am now about to describe, as they will find that one has been under my observation for four years, another two years and a half, and the third for the space of eighteen months; so that a considerable time has been allowed to watch the effect of the treatment which is here recommended.

CASE I.

James Applebee, Baldwin-street, Old-street, was born on the 19th May, 1807, and his mother immediately after his birth observed a round and transparent tumor on the loins, of the size of a large walnut.

Mr. Deering, who was her accoucheur, requested Dr. Petch to see the child with him, who informed the mother of the dangerous nature of the complaint, and of the probability of its fatal termination.

On the 22d of June, 1807, the child was brought to my house, and I found that although it had spina bifida, the head

was not unusually large; that the motions of its legs were perfect, and its stools and urine were discharged naturally.

I applied a roller around the child's waist, so as to compress the tumor, being induced to do so from considering it as a species of hernia, and that the deficiency of the spine might be compensated for by external pressure.

The pressure made by the roller had no unpleasant influence on its voluntary powers; its stools and urine continued to be properly discharged, but the mother thought that the child was occasionally convulsed.

At the end of a week, a piece of plaster of Paris, somewhat hollowed, and that hollow partly filled with a piece of lint, was placed upon the surface of the tumor: a strap of adhesive plaster was applied to prevent its changing its situation, and a roller was carried around the waist, to bind the plaster of Paris firmly upon the back, and to compress the tumor as much as the child could bear.

This treatment was continued until the month of October, during which time the tumor was examined about three times a week, and the mother reported that the child was occasionally convulsed.

When the child was five months old a truss was applied, similar in form to that which I sometimes use for umbilical hernia in children, and this has been continued ever since.

At the age of fifteen months it began to make use of its limbs; it could crawl along a passage, and up two pair of stairs.

At eighteen months, by some accident, the truss slipped from the tumor, which had become of the size of a small orange, and the mother observed, when it was reduced, that the child appeared in some degree dull; and this was always the case if the truss was left off for a few minutes, and then re-applied.

At fifteen months he began to talk; and at two years of age he could walk alone.

He now goes to school, runs, jumps, and plays about as other children. His powers of mind do not appear to differ from those of other children. His memory is retentive, and he learns with facility. He had the measles and small-pox in the first year, and the whooping-cough at three years. His head, previously and

subsequently to the bones closing, has preserved a proper proportion to the other parts of his body.

The tumor is kept by the truss entirely within the channel of the spine; but when the truss is removed, it soon becomes of the size of half a small orange. It is therefore necessary that the use of the truss should be continued. When the truss is removed, the finger can be readily pressed through the tumor into the channel of the spine.

CASE II.

January 21st, 1809, Mrs. Little, of No. 27, Lime-house Causeway, brought to my house her son, aged ten weeks, who was the subject of spina bifida.

The tumor was situated on the loins; it was soft, elastic, and transparent, and its size about as large as a billiard ball when cut in half; his legs were perfectly sensible, and his urine and fæces were under the power of the will.

The child was taken to a surgeon of eminence, who said that nothing could be done, and that the child would not live more than four or five months, and ordered the swelling to be washed with vinegar and water.

Having endeavoured to push the water contained in the tumor into the channel of the spine, and finding that, if the whole was returned, the pressure would be too great upon the brain, I thought it a fair opportunity of trying what would be the effect of evacuating the swelling by means of a very fine pointed instrument, and by subsequent pressure to bring it to the state of the spina bifida, in Applebee's child.

I therefore immediately punctured the tumor with a needle, and drew off about two ounces of water.

On the 25th of January, finding the tumor as large as before it had been punctured, I opened it again, and in the same manner, and discharged about four ounces of fluid. The child cried when the fluid was evacuated, but not whilst it was passing off.

On January 28th, the tumor was as large as at first. I opened it again, and discharged the fluid. A roller was applied over the tumor and around the abdomen.

February 1st, it was again pricked, and two ounces of fluid discharged.

On the 4th, three ounces of fluid were discharged.

On February 9th, the same quantity of fluid was evacuated as on the 4th; but instead of its being perfectly clear, as at first, it was now sanious, and it had been gradually becoming so in the three former operations.

On the 13th, the same quantity of fluid was taken away; a flannel roller was applied over the tumor and around the abdomen; a piece of pasteboard was placed upon the flannel roller over the tumor, and another roller over the pasteboard to confine it.

On the 17th three ounces of fluid, of a more limpid kind, were discharged; the pasteboard was again applied.

On the 27th the surface of the tumor inflamed; the fluid, not more than half its former quantity, was mixed with coagulable lymph, and the child suffering considerable constitutional irritation, was ordered calomel and scammony, and the rollers were discontinued.

February 26th, the tumor was not more than a quarter of its former size; it felt solid; the integuments were thickened, and it had all the appearance of having undergone the adhesive inflammation.

On the 28th it was still more reduced in size, and felt solid.

On March the 4th it was in the same state as on the 28th of February.

March the 8th, the swelling was very much lessened; the skin over it thickened and wrinkled; a roller was again had recourse to; a card was put over the tumor, and a second roller was applied.

March the 11th, the tumor was much reduced; the skin covering it was a little ulcerated. On the 15th it was flat, but still a little ulcerated.

On the 27th the effused coagulable lymph was considerably reduced in quantity, and of very firm consistence.

On the 2d of May nothing more than a loose pendulous bag of skin remained, and the child appearing to be perfectly well, the bandage was soon left off.

On December the 18th it was attacked with the small-pox, and went well through the disease.

The skin now hangs flaccid from the basis of the sacrum; its centre is drawn to the spine to which it is united, and thus the appearance of a navel is produced in the tumor by retraction of the skin.

The pricks of the needles are very obvious on each of the punctured parts of the tumor, forming slight indentations.

My friend and neighbour, Dr. Yelloly, saw the progress of the cure in this child, it being from time to time sent to his house.

CASE III.

January 1810, Hannah Jackman, aged eleven days, was brought to my house with spina bifida, having *an ulcerated state of the skin over it*. The woman had been delivered by Mr. Roseworn, a pupil of Dr. Haighton's and Dr. H. had seen the child.

Jan. 5th, the tumor was punctured with a needle, and the fluid was discharged.

Jan. 9th, the tumor was filled with coagulable lymph, as was proved by its inflamed appearance, and the firmness of its feel; the child appeared in great pain, had no stool, and suffered considerable constitutional irritation; it was ordered a dose of calomel and a glyster.

On the 10th, it had evacuations both by stool and urine, and on the 11th Mr. Roseworn reported that the tumor was less in size; that it was still solid; that the child was considerably torpid, but sucked heartily.

On the 13th the ulcer in the spina bifida was almost healed; the tumor was flaccid; convulsions which had begun on the evening of the 11th had been frequent to the 13th; the child foamed, struggled very much, and seemed very weak.

On the 16th my assistant, Mr. Lewis, saw the child, and reported that the convulsions ceased on the 15th; that the child was much reduced, and that it was costive; the tumor was nearly level with the surrounding skin, soft, and of a red colour; it had still a small ulcer on it. Glysters were directed to be given.

Jan. 19th, the tumor had become very small, and but a trifling ulcer remained. The child, however, was convulsed; its eyes were drawn under its upper eye-lids; it was much reduced; it had retention of urine for a day and a night, and was extremely costive; it had ceased to suck for several days, but began to take the breast again on that morning.

Jan. 23d, the child sucked heartily; the tumor appeared to contain some fluid in its centre; the ulcer upon its surface was healthy, and nearly healed.

Jan. 26th, the tumor was somewhat increased; the child sucked, was free from convulsions, and improved in strength.

February 3d, the ulcer was healed; the tumor was much reduced, and the child greatly improved in its strength.

The child was again brought to me on the 13th, at which time the adhesive inflammation appeared to be complete. On the 15th of the same month it was seized with convulsions, which continued until the 24th; its eyes became inflamed on the 13th, and continued so until its death, and it died on the 25th of February.

Inspection on the 27th.—The bones of the cranium were very much separated at the sutures; there was no hydrocephalus internus; the brain was unusually soft; the ventricles contained about six ounces of a limpid fluid, but there were clots of coagulable matter floating in it.

In the preparation which I have now the honor to show to the Society, it will be seen that the adhesive inflammation is very complete, so that no cavity is left for the reception of the spinal fluid.

CASE IV.

—Sterney, son of Mr. Sterney, a butcher at Peckham, was brought to me on the 10th January, 1810; it had a very large spina bifida at the basis of the sacrum.

I opened it on the 15th by the same means as I have before described, and discharged about an ounce of limpid fluid.

On the 17th I again opened it, and removed about an ounce of fluid, which was a little bloody; the child had been restless and had green stools, which is always a marked sign of irritation in children.

On the 19th the child had two convulsions; the tumor was opened; the fluid was a little sanious, and the tumor contained some solid matter; the child was much purged, and this was directed not to be repressed.

Two ounces of fluid were discharged on the 24th, and on the 26th an ounce and an half of fluid was drawn off and a dossil of lint was applied upon the opening from the spinal canal into the tumor; this was firmly bound down by a roller.

On the 30th of January, 1st of February, 4th, 11th, and 26th, the tumor was opened.

Two ounces of fluid were also discharged on the 27th, and then a piece of sheet lead was placed upon the tumor lined with lint and covered by a roller.

On February 28th, and on March 1st and 2d, it was opened.

On the 3d, plaster of Paris was applied upon the swelling after discharging its fluid; this was confined by a roller tightly applied.

On the 4th it had convulsive twitchings of its hands, and quickened respiration; it was restless, hot, and cried much; half an ounce of fluid was discharged.

5th.—Vomited frequently; the swelling was again opened.

6th.—The fluid was discharged; lint and adhesive plaster were afterwards applied, and this plan was repeated on the 8th and 9th.

10th.—The tumor was not opened, because it felt so hard as to induce me to believe it had adhered.

11th.—Stools green; vomited frequently; bandage still applied, but not the adhesive plaster.

13th.—Child sick; stools green.

14th.—Two ounces of fluid discharged; plaster and roller applied.

17th.—Plaster of Paris applied wrapped in lint, and bound very tight.

19th.—Comatose, and convulsed, as it was thought, from the pressure of the bandage and plaster of Paris; these were removed, and a lighter bandage applied.

22d.—The child, which on the 19th appeared to be dying, is better to-day.

24th.—Is more lively; it sucks but little, the tumor being very large and full; a truss was applied.

27th.—The truss is to be continued, as the tumor is smaller.

30th.—Tumor reduced; the child has cut a tooth; the truss continued.

April 4th.—Appeared to be suffering pain and sickness from the truss, and it was removed.

9th.—Tumor pricked, and the truss re-applied.

14th.—The tumor again pricked.

18th.—Continues to wear the truss; the tumor was opened to-day; a handkerchief was doubled under the truss; the child vomited after its application.

22d.—Appeared in good health; the tumor was pricked, and again on the 26th, when there was some coagulable lymph in the fluid.

May 2d.—The swelling was pricked; also again on the 6th, and the quantity of fluid which was discharged was not diminished, continuing to amount to from two to three ounces.

The child was now sent to Messrs. Sharpe and Arnould, Surgeons at Peckham, who attended the family, and who pricked the swelling at different times, and discharged the same fluid both in quantity and quality which I have described.

The adhesive process was, however, unequal to close so large an aperture as existed from the spine in this case, and I therefore abandoned the adhesive plan, and directed that the same mode of treatment should be pursued as in Applebee's case; that a truss should be applied, and constantly worn upon the part, and that the palliative rather than the radical cure should be attempted.

The tumor has been gradually diminishing under this mode of treatment; the child has grown in proportion to other children, and at the age of a year and an half is a very healthy boy.

These, then, are the two modes of treatment which I have pursued for the relief of those who are afflicted with spina bifida; the one palliative only; the other radical.

The first consists in treating the case as a hernia, and applying a truss to prevent its descent; and the second in producing

adhesion of the sides of the sac, so as to close the opening from the spine, and stop the disease altogether. The first is attended with no risk. The truss forms an artificial vertebra when the natural is defective, a buttress which supports the part, and prevents the increase of the disease; but in this mode of treatment the truss is required in future life, for if discontinued the tumor re-appears, and will grow, as hernia does, to great magnitude, but with more fatal consequences.

On the contrary, the adhesive mode of cure exposes the patient to much constitutional irritation, but leaves him without the apprehension of the future return of the disease. And a finer and more healthy child cannot be seen than that which was cured by this mode of treatment.

It may be also observed that this mode does not prevent the subsequent attempt at the palliative treatment, if the radical should not be successful.

But as there are many cases of spina bifida which cannot be cured, it is right that I should state what are those which will not admit of relief.

If the tumor is connected with an unnatural enlargement of the head, hydrocephalus internus is conjoined with spina bifida; and the water will accumulate in the ventricles, if the tumor in the loins is attempted either to be palliated or radically cured.

If the lower extremities are paralytic, or the fæces and urine are discharged involuntarily, there is no hope of relief.

If the tumor has burst at the time of birth, or bursts soon after, there is little hope of cure; for although the opening in the skin may be closed by lint and adhesive plaister, and union be produced so as to admit of no further discharge of water, yet hydrocephalus internus will still succeed. In a case which I saw with Mr. Young, Surgeon, at Lambeth, I closed the opening, and applied a truss, but the head enlarged, and the child died after eight months with hydrocephalus internus.

The deficiency of the spine is sometimes so great as to lead to the production of a most extended tumor at the time of birth, and when this is the case the nerves are so far protruded from the spinal canal as to injure the structure of the spinal marrow, and to render every attempt at cure unavailing.

I should feel myself deficient in that liberality with which our profession ought ever to be marked, and usurping more than my due, if I did not state that the principle of the radical cure as proposed for Spina Bifida, is similar to that recommended by Mr. Abernethy in his work on Psoas Abscess.

The mode, however, which I have employed for the purpose is, I believe, the only safe one, that of puncturing the part with a needle; for every opening of a larger size will be attended with the utmost danger.

I have for many years used this plan in cases of ganglia, when I could not burst them by a blow or excite their removal by pressure or irritation; and I have never seen it followed by inflammation or any serious consequence; and it may be used in cases of accumulations in joints and other cavities where larger openings are dangerous.

Dr. Marcet was so kind as to analyse the fluid which was taken from the spina bifida of Little's child, and will probably soon favor the Society with the result of his observations on this fluid, compared with that of hydrocephalus internus.

A Case of Aneurism by Anastomosis in the Orbit, cured by the Ligation of the common Carotid Artery. By BENJAMIN TRAVERS, Esq. Demonstrator of Anatomy at Guy's Hospital, Surgeon to the Hon. East India Company, and to the London Infirmary for curing Diseases of the Eye.

[From the Medico-Chirurgical Transactions, Vol. II.]

FRANCES STOFFELL, (aged 34, a healthy active woman, of fair complexion, middle stature, and the mother of five children,) on the evening of the 28th of December, 1804, being some months advanced in pregnancy, felt a sudden snap on the left side of her forehead, which was attended with pain, and followed by a copious effusion of a limpid fluid into the cellular substance of the eyelids on the same side. For some days preceding she had complained of a severe pain in the head, which was now increased to so great a degree, that for the space of a week she was unable to raise it from the pillow. The œdema-

tous swelling surrounding the orbit was reduced by punctures; an issue was set in the temple for a smart attack of ophthalmia which supervened, and leeches and cold washes were applied. She now first perceived a protrusion of the globe of the eye which affected the sight, and a circumscribed tumor, elastic to the touch, about as large as a hazel nut, appeared upon the infra-orbitary ridge. Another softer and more diffused swelling arose, at the same time, above the tendon of the orbicularis palpebrarum. The lower tumor communicated both to the sight and the touch, the pulse of the larger arteries; the upper gave the sensation of a strong vibratory thrill. The swellings grew slowly, and the skin between the eyes and that of the lower eyelid became puffed and thickened. The globe of the eye was gradually forced upwards and outwards, and its motions were considerably impeded. She had a constant noise in her head, which, to her sensation, exactly resembled the blowing of a pair of bellows. The pulsatory motion of the tumors was much increased by agitation of mind, or strong exercise of body. But the most distressing of her symptoms was a cold obtuse pain in the crown of the head, occasionally shooting across the forehead and temples. She was compelled to rest the left side of her head on her hand when in the recumbent posture, and found the beating and noise to increase sensibly when her head was low and unsupported.

Such was the substance of the patient's report when I was requested to see her by my friend Dr. Cholmeley, assistant physician to Guy's hospital. Her physiognomy was hard and coarse, and the skin in the region of the orbits appeared morbidly thick and wrinkled. The eyebrow of the diseased side was straitened, and driven from two to three lines above the level of the opposite eyebrow. The hollow of the orbit was lost, the superior lid rising convex from the superciliary ridge, owing to the strained elevation of the globe of the eye. The upper half of the inner canthus was filled by the thrilling tumor, which presented a loose woolly feel, was very compressible, and when firmly compressed, offered a slight pulsation. The veins of the superior lid were varicose from distension; the skin was much pursed over the lacrymal sac, and the veins on the sides of the nose turgid. The lower tumor, which projected above

the suborbital hole, was of a conical shape, and firmly elastic to the touch. The under lid was raised as far as to the outer angle of the orbit, above the apex of the cheek. This lower tumor could be emptied or pressed back into the orbit, but the pulsation then became violent; and from the increased pressure of the globe upon the roof and side of the orbit, the pain was insupportable. Careful compression of the temporal, angular, and maxillary arteries produced no effect on the aneurism. Upon applying my thumb to the trunk of the common carotid, I found the pulsation cease altogether, and the whiz of the little swelling was rendered so exceedingly faint, that it was difficult to determine whether it continued or not. The recent increase of puffiness in the skin over the root of the nose, and below the inner angle of the opposite eye, had given alarm to the patient and her friends, who feared, not without some appearance of reason, a similar affection of the right orbit.

When I first saw the disease, I felt persuaded that it could be no other than that described by Mr. John Bell, under the term '*Aneurism by Anastomosis.*' Indeed it bore so strong a resemblance in its principal features to several of Mr. Bell's cases, and in particular to that communicated by Mr. Freer of Birmingham, whose patient refusing assistance expired of hemorrhage, that I considered the sensible growth of the disease an argument of sufficient force to justify any rational effort at its restriction. From the character of similar cases, and the idea which I had formed of this, it was to be expected, that, although it had been slow in its formation, it would be rapid in its increase; and unlike the aneurism of trunks, would resist control as it acquired size. I first tried the effect of pressure on the swelling, but, although moderate, it could be borne only for a very limited time, by reason of the pain attending the exasperated action of the arteries. Cold applications had been already made use of without any evident advantage, but indeed the duration and aspect of the disease made this remedy appear trifling. Excision, the only method of which in similar cases experience had confirmed the success, was clearly impracticable without extirpation of the eye; and from the great displacement of the globe, and the obvious origin of the disease within

the orbit, I considered the result of such an operation to be most precarious. Being satisfied of the growth of the disease; knowing from a late happy precedent the perfect practicability*, and under favorable circumstances the moderate risk of placing a ligature on the carotid artery; and particularly reflecting that the obstruction of such a channel, must, at all events, be followed by a sensible and permanent diminution of the impulse of blood destined to the disease, I proceeded to the operation on Tuesday the 23d of May, 1809, in presence of Dr. Cholmeley, Mr. George Young, Mr. Brickenden, and other gentlemen.

The patient was laid supine; the neck raised by a pillow, the chin slightly turned to the left shoulder. An incision, about two inches and a half in length, was commenced at the distance of one inch above the sternal extremity of the clavicle, and carried in an oblique direction along the anterior edge of the mastoid muscle. The fibres of the muscle being exposed, its edge was raised, and the sheath of the vessels cautiously cut open on the tracheal side. Through this opening, which was of very small extent, a curved eyed probe, carrying a stout round ligature, was passed beneath the artery†, care being taken to exclude the nerve. The probe being cut away, the ligatures were drawn apart from each other, the lower being tied at the lowermost point of the denudation of the artery, the upper at the highest. They were about one fourth of an inch distant; and whilst they were tightened, the division of the internal coat of the vessel could be distinctly felt. The lips of the wound were lightly brought together by adhesive straps, and the ligatures drawn out opposite to the point of their application on the artery.

The patient, before she quitted the table, observed that the pain was numbed, and that the noise in her head had entirely ceased. The small tumor over the angle of the eye was still thrilling, but very obscurely. Two hours after removal to her bed, I found her free from pain, but uneasy from having pre-

* See a case of Carotid Aneurism, &c. by Astley Cooper, Esq. *Medico Chirurg. Trans.* vol. i.

† The pulsation of the lower tumor immediately ceased upon compressing the vessel with the finger as it lay over the probe.

served the same posture. She was fatigued, and anxious to procure sleep.

Eight o'clock, P. M.—Patient has been distressed with nausea; dozed frequently, but was as frequently disturbed by nervous startings, and ramblings about her husband and children; complains of severe pain darting from temple to temple, and soreness of her back and loins; pulse 90, and rather hard; skin cool, slight thirst. The lower tumor, I was concerned to find, had already acquired the thrilling motion of the upper. She was ordered the saline effervescing draught every third hour.

Second day, eight o'clock, A. M.—Restless all night, and continually changing posture. From two to four o'clock particularly uneasy: she even attempted to get up and dress herself; appears now pretty comfortable, having had a short refreshing sleep. Pain in the back very severe; that in the head confined to the forehead, and somewhat abated in violence; pulse 124 and hard; tongue lightly furred; some thirst.

Two o'clock, P. M.—Restlessness and other symptoms continue; pulse 132.

Eight o'clock, P. M.—Says she is much better; free from pain in the head, and has less in the loins; pulse as before; tongue moist; skin cool; has enjoyed some short but refreshing sleep; complains of stiffness in the throat and neck: mind tranquil.

Third day, ten o'clock, A. M.—Has passed a pretty quiet night; slept soundly at intervals; pain in her back has ceased. Much agitated by the firing of the tower guns, and has since had a very severe pain in the top and back of the head; pulse 112, fuller, and sensibly softer. The tingling or thrilling sensation is experienced in both tumors upon light contact of the finger; if firmly compressed, a pulse may be perceived in the lower.

Ten o'clock, P. M.—An enema has been administered without effect; has been troubled with colicky pain in the abdomen, and having had no evacuation, was ordered a purgative saline draught.

Fourth day, nine o'clock, A. M.—No sleep till three o'clock, owing to the pain in her head; pain now less severe. Had a co-

pious evacuation from the bowels at seven o'clock, and the catamenia as expected.

Four o'clock, P. M.—Complains of heavy pain in the occiput; no other symptom of commotion in the system; pulse 92 and soft; sits half erect; has eaten some light pudding with appetite.

Fifth day, ten o'clock, A. M.—Has passed an uneasy night from continued pain in the top and back of the head. She complains that though the pain is deeper seated, it renders the scalp tender. The tumors are very considerably diminished, and the eye less prominent. When she first sat up, her head was so light that she was immediately compelled to resume the recumbent position. She still experiences so much of the same feeling as to require support. I observed that the globe of the eye communicated a slight pulsation. Her sight is short, and objects appear to her larger than natural, and misty*.

Four o'clock, P. M.—Is comfortable in every respect, having slept for some hours together; pain in the head has ceased; pulse 84 and natural. Can preserve the sitting posture longer without support.

Sixth day, noon.—Ate a mackerel with appetite for dinner; continues free from pain. On removing the dressings, pus flowed out profusely by the side of the ligatures. Above and below them the wound has united by the first intention. Granulations and discharge healthy.

Seventh day, noon.—Slept perfectly undisturbed all night; was slightly affected to day by the ringing of bells, and finds any continued noise painful. I allowed her to eat meat. The thrill of the lower tumor is not perceived when the upper is compressed; but it has besides a feeble though distinct pulsation.

Eighth and ninth days.—Going on well in all respects. Granulations and discharge healthy.

First of June, tenth day. Has had a bad night and much restlessness, owing to a return of the pain in her head, which lasted for three hours and left the integuments sore. Has been up, and finds she can walk better than she expected. The

* In the misty vision preceding blindness from idiopathic affection of the retina, objects appear for the most part smaller than natural.

wound would heal immediately but for the ligatures; they are fast rising towards the surface, but are not yet loose.

Twelfth day.—Makes no complaint; sits up and works in her bed without fatigue; eats and sleeps well.

Fourteenth day.—Still has occasional pain in the summit and back of the head; but it is more tolerable than before the operation.

Seventeenth day.—Sat up to her tea last night, and sits in a room adjoining her chamber this morning; feels weak; fears her eye is more displaced; thinks the brow is pushed higher, and the lower tumour larger. Her husband and friends have expressed the same opinion. The ligatures continue to loosen daily. The left side of the neck is stiffened from the ear to the shoulder, which prevents the free motion of the head. The fibres of the platysma myoides feel rigid and corded, from the inflammation which the wound has excited. She has had shooting pains in the eye since the last report, but they subsided on leaving off a green silk shade, which she remembers to have produced the same effect before the operation.

Twenty-first day.—The upper ligature came away without force. The patient finds no inconvenience from sitting up and working all day. She was astonished to find that she could read small print and do fine work with her right (i. e. sound) eye, which she has been unable to do for years. The stiffness of the left side of the neck is decreased. She has been pressing, some days past, for permission to walk out.

Twenty-second day. The lower ligature had come away spontaneously, and was found in the dressings. From it hung the slough of the artery included between the threads.

From this day she was permitted to go out. On the twenty-third she walked two miles, by which, as might have been foreseen, she was greatly exhausted. On the twenty-ninth she returned to her family. The wound quickly healed. At the end of the fifth week she could perform all the duties of her situation as well as before the operation. She expressed herself well satisfied with the obvious diminution of the tumor, the decrease of the pulsation, and the total freedom she enjoyed from pain, which had distracted her for years.

20th September.—It is now four months since the operation was done. The tumours are evidently smaller, and their motion materially diminished. The eye is likewise less projecting. The cold dull pain, though formerly uninterrupted, is now but rarely felt. The artery of the left side may be distinguished very feebly beating below the angle of the jaw. The carotid of the opposite side contracts with more than ordinary force. Mr. Brickenden, who has watched the disease from its commencement, and had observed its more than usual progress before the operation, considers it to have received a decided check from that period. The husband and friends of the patient, as well as herself, are of the same opinion. She suffers occasionally from irregular digestion, to which she has been long subject; but in other respects is as well, and endures as much labour with as little fatigue as formerly.

On Saturday, 28th of October, she miscarried, at the period of about ten weeks from conception. The hemorrhage was so considerable as to induce syncope, and leave her in a state of extreme debility. On the succeeding morning it was observed that the upper tumor was flattened, and the pulsation had altogether ceased. On the Monday ensuing she felt pain in the affected side of the head, and was feverish. In the course of a few hours the cellular substance in the region of the orbit was filled with a serous fluid precisely similar to that experienced in the commencement of the disease; the pain was abated, and the œdematous swelling and heat of the surface reduced by a cold lotion. She has now (November) no pain in her head; but owing to her extreme debility from loss of blood, is subject to occasional palpitation of the heart and giddiness. The upper tumor and the gathers of integument between the eyebrows have totally disappeared. The eye projects less; the lower tumor is inelastic and has no preternatural pulsation.

During the Christmas following she was afflicted by the loss of a child, before she had recovered the debility which her miscarriage had induced. She was then seized with faintings, accompanied with a loss of sense and motion, frequent retchings, and discharges of blood by the bowels. For nearly two months she was confined to her bed, and still remained in a state of lowness, from which her apothecary and friends had no expect-

tation of her recovery. In June following she went by my advice to visit some friends in the country, thirty miles distant from London, and remained there for two months. She returned in health, which she has ever since enjoyed uninterruptedly in a higher degree than for many years past.

May, 1811.—Mrs. Stoffell is looking florid and healthy. Of the disease, a knob of the size of a large pea over the inner angle of the eye is the only vestige that remains; she is still occasionally subject to pain in her stomach, and other symptoms of dyspepsia, a complaint with which she has been troubled for the last fifteen years.

Having never seen a parallel case to that which I have related, I am unable to add information on the nature of this rare but formidable species of tumor.

I have thought the case worthy of detail on two accounts; first, because it furnishes a second conclusive example of the safety of an operation, which has been commonly regarded as impracticable or injurious to the functions of the sensorium; secondly, because it determines the influence which, by the ligature of the carotid trunk, we possess over the diseased condition of its branches. It appears that, like every other trunk of the arterial system, the carotid may be obstructed without injury to the organ which it supplies; or in other words that the collaterals will convey a quantity of blood sufficient for its nourishment and functions.

The *circulus arteriosus* formed by the communion of the basilar and carotid arteries at the basis of the brain, seems to be the resource which nature has provided for the preservation of the cerebral circulation under this emergency.

It has been supposed that by the obstruction of one of the carotid arteries, the volume of blood supplying the brain was permanently diminished. The reason for this opinion was suggested by the passage of the carotids and vertebrals through bony canals, which would prevent an augmentation of their capacity. It might be further supposed that the intention of nature in this peculiarity of structure was to prevent the deleterious effect of the pressure which would result from dilatation of the vessels in an organ so delicate. But can it be imagined that

the functions of such an organ should be unaffected by the permanent privation of one fourth part of its circulating blood? Besides, if the volume of blood be not increased by diversion into other channels, how should the pressure be increased? The mere change of place could be of no importance, because at whatever point pressure was applied, it would be equally diffused over the mass, as is proved by the symptoms following the depression of a portion of fractured bone of the diameter of a shilling.

Nor can the fact of diminished volume be determined from the inclosure of the carotid and vertebral arteries in bony canals; but let it be granted; the unobstructed carotid acts with increased force, and the increase of but a few beats in frequency would amply compensate for the loss of volume.

But it is superfluous to look beyond the obvious visible effect. The disease appeared essentially to consist in a preternatural impulse of the blood conveyed to it. By obstructing the direct channel this impulse was broken, the circulation became anastomotic, the blood which was before influent, was now refluent, it was supplied at second-hand, instead of directly from the heart. Is not this the *modus operandi* of the ligature in the cure of all aneurisms?

Case of Congenital Cataract; with some Observations on the Means of artificially Dilating the Pupil in the Operations of Extracting and Depressing the Cataract. By JOHN HENRY WISHART, Esq. Fellow of the Royal College of Surgeons, Edinburgh.

[From the Edinburgh Medical and Surgical Journal, for January, 1813.]

JAMES DRYSDALE, a boy about eight years of age, was brought to me from Kinross, on the first of October, with cataract in both eyes. The pupils contracted and dilated very readily; he was able to distinguish day from night; and if the hand or any opaque body was held above and before his eyes, he immediately put his hand to it; but he was unable to see any object placed before him, or under his eyes. On dilating

the pupils by the application of the solution of the extract of hyoscyamus, the cataract of the left eye was observed to be of an uniform dusky gray colour; that of the right had a ground of the same colour, but several small angular spots were perceived in it of a bright white colour.

From the history of this case, which I received from Mr. Annan, surgeon at Kinross, it appeared very probable, that, if the boy was not absolutely born blind, he had lost his sight a few days after birth. It was very soon observed, that there was something remarkable about the child's eyes; it was likewise noticed, that the child did not close the eyelids, even when exposed to the bright light of the sun. The child was about four months old, when it was positively ascertained that he was blind. There was evidently a great deficiency in intellectual faculties; but it was difficult to decide, whether it was such as to prevent him gaining his bread, provided his sight was restored. His education had been totally neglected, and he spoke very indistinctly. He was very averse to allow his eyes to be touched, and expressed scarcely any anxiety for the restoration of his sight.

Under these circumstances, I resolved to try the effect of the operation for removing the cataracts, and it was performed on the 4th of October, assisted by Dr. Duncan, jun., Mr. Nasmyth, &c. Very great difficulty was met with in securing the patient. The pupils having been previously dilated by the solution of the hyoscyamus, and aware, from the appearances described, that I had a capsular cataract to operate on in the right eye, and a soft one in the left, I used a needle similar to that of Professor Scarpa, but with a smaller curvature at the point, and made very fine and slender. The lens in the left eye was found to be of a melicerous appearance, was readily broken down, and several of the opaque flakes passed into the anterior chamber of the aqueous humour. The cataract of the right eye was purely capsular. On being pierced with the needle, there appeared as if a thin vapour had passed before the pupil; and when the more dense parts were separated as much as possible, the pupil became almost clear. The eyes were covered with a few folds of wet lint, and a pledget of linen, spread with

simple ointment, was applied over it, and secured with a single turn of a roller round the head, and he was put to bed.

5th.—Slept almost all the afternoon, and made no complaint, and has had a good night. Pulse 96; skin rather hot. The eyes were bathed with warm water: the lids adhered slightly. In the morning, while eating his breakfast, said he could see light. On attempting to open the eyes, he resisted so strongly that I thought it prudent to desist. The lint was removed, and the eyes were covered with a compress.

Hab. stat. pulv. jalap. gr. xii.

6th.—Powder operated well; skin cool, pulse natural. After bathing the eyelids with warm water they were opened. The pupil of the right eye is nearly clear, except a very small speck at the under part; the pupil of the left eye is full of opaque fragments floating about. There is slight redness of the conjunctiva, and some ecchymosis at the place of the puncture of the needle.

7th.—The pupil of the right eye still continues clear: that of the left improving. Both eyes are very tender on exposure to light, but not painful. Last night fell a crying on being left in the room without a light.

8th.—Yesterday evening complained of headache. This morning both eyes were found to be inflamed, especially the right. They are rather more sensible to the light than before, but says they are not painful. He was ordered a repetition of the laxative, and to have the eyes bathed with a collyrium of a grain of the muriate of mercury in six ounces of water, with a drachm of the vinum opii, to be used a little warm.

9th.—Inflammation of both eyes much abated, and he opens them very readily to day. The pupil of the right eye is perfectly clear; that of the left is becoming clearer at the upper part. Cont. collyr.

13th.—Right eye nearly free from inflammation; the pupil of the left eye much clearer.

From this date the left eye gradually improved, and, by the 6th of November, when he was sent home, more than one half of the pupil was quite clear, and he saw tolerably well with it. Both eyes had lost, in a considerable degree, the rolling motion; but, from the mental defect already noticed, it was difficult to ascertain the exact state of his sight. How-

ever, he seemed highly delighted on being dressed in a new suit of clothes. It may be further mentioned, that his father is said to be in a state approaching to idiotism.

In speaking of the dilating the pupil, previous to the operation, I mentioned that I had used the solution of the extract of hyoscyamus, and not the belladonna, which is now so generally used in this country for that purpose. The singular property possessed by these narcotics has been long known on the Continent, and in this country was first used in the operation for cataract by the late Mr. Saunders. Van Swieten,* speaking of palsies brought on by exposure to the vapours of arsenic, mercury, &c. remarks, that there are other poisons which may produce the disease even externally applied, and relates the following case: "A lady of quality applied a little bit of a fresh leaf of that kind of nightshade which is commonly called *Belladonna*, to a small ulcer below her eye, which was suspected to be cancerous, and, in a night's time, the pupil of the eye lost all its motion, remaining quite dilated, even while the eye was exposed to a strong light; but the nightshade being removed, the motion of the pupil gradually returned." Ray† affirms that he saw this case, and that it did not happen accidentally: for three different times, on repeating the application of the nightshade, the same effect constantly followed. Galen‡ asserts, that he has frequently observed the same bad effect from the imprudent use of opium, mandrake and henbane, to relieve violent pains in the eye; and more modern authors mention cases of blindness, squinting, weakness of sight, produced by the application of stramonium, mandrake, aconite, cicuta, &c. A very remarkable case is related by Dr. Daries, in his inaugural dissertation *De Atropa Belladonna*.|| In preparing some extract of this herb for Reimarus of Hamburgh, and bruising the recent plant with the flowers and fruit, a drop of the herb or of the succulent berry spirted into his right eye. He endeavoured to remove the slight irritation by rubbing his

* Commentaries on the Aphorisms of Boerhaave, vol. x. § 1060.

† Histor. Plantar. L. xiii. c. 23. p. 680.

‡ Method. Medendi, L. iii. c. 2.

|| Sylloge selectorum opusculorum argumenti Med. Practici, collegit et edidit E. G. Baldinger, vol. ii. 8vo. Gottingæ, 1777.

eye. In three minutes, on the uneasiness going off, a slight dimness of sight was observed, which increased rapidly, and in a quarter of an hour complete blindness came on, without any pain, the other eye remaining sound. Being very much alarmed, he consulted Reimarus about his case, and after three weeks the sight was completely restored. But Reimarus's account of the case, and his inferences from it, will be more satisfactory. "Quod attinet ad oculum tuum, olim, inter conscindendam *Atropæ Belladonnæ* herbam, ita affectum, ut per aliquod tempus fere visu privaretur, probe memini. Deprehendi nempe iridem ejus oculi adeo resolutam et patentem, ut fere dimidiæ tantum lineæ latitudo ambitus superesset, ampla vero choroideæ nigrities transpareret. Jam, cum effectum similem ab ore assumpta *Belladonna* observari nossem, non dubitavi, quod ipse tu quoque suspicatus fueras, externe applicatum venenum idem efficere posse et ab insperso inter parandum succo paralyisin illam ortam, quam tamen duraturam haud esse speravi. Interius jam acetum quoddam concentratum assumpseras, in cujus usu pergendum esse ratus sum: suasi tantum, ut simul ad irritandos nervos exterius volatilis oleosi spiritus vapores oculo ægro admitterentur. Sive igitur sponte, seu his adjuvantibus medicamentis, factum est, ut sensim et visus oculo et contractio pupillæ redirent. Ego vero mecum reputans, istam *Belladonnæ* vim haud spernendo in chirurgia usui esse posse cogito. Nempe cum in excidenda lente crystallina, sicut pelluciditatem amiserit, haud leve impedimentum objiciat irritatio et contractio nimia pupillæ, adeo ut sæpe iris per educendam lentem laceretur; quidni succo *Belladonnæ*, paralyisin illi innocuum per aliquod tempus inducimus? nec solum extractio lentis inde longe facilior obtineretur, sed et simul illud incommodi, ne oculus repentino lucis sensu læderetur."

As far as I have been able to learn, Reimarus was the first who proposed using the belladonna in the operation for extracting the cataract,* and in the *Memoires de la Société Philomathique* for the year 1797, he mentions, that Dr. Grasmeyer of Hamburgh employed it with success; and I have been in-

* This proposal of Reimarus is also noticed in Dr. Underwood's Treatise on the Diseases of Children, vol. ii. p. 53.

formed by my friend Dr. Duncan, junior, that, in the year 1796, he was carried by Reimarus to see Dr. Grasmeyer operate on a case of cataract where the belladonna had been previously applied. .

Hitherto I have chiefly noticed the use of the belladonna in dilating the pupil; I shall now relate various experiments made with the extract of hyoscyamus, as also a few comparative trials made with these two narcotics. Professor Himly of Göttingen* accidentally learnt the effect of the local application of the hyoscyamus, and recommended its use in the treatment of some diseases of the eye. After the application of a collyrium of a solution of the extract of hyoscyamus, he found the eye exactly in the same state as in a case of complete amaurosis, viz. the iris quite motionless, so far drawn back, that it formed a ring scarcely a line in breadth, with its inner edge turned a little backwards, so that its anterior surface was concave towards the central point; the pigmentum nigrum, at the bottom of the eye, had not its usual black colour, but a grayish appearance. The patient, notwithstanding, saw as well with this eye as before, except that there was something glimmering before it. Very soon after rubbing a little of the ol. cajeputi on the eyebrow, the pupil appeared beginning to contract, and the dilatation in a few hours was completely gone. That this effect follows in all cases he completely proved by various experiments. He uses a solution of a drachm of the extract in an ounce of water, of which he lets a few drops fall into the eye, and keeps it there a short time by bending the head backwards. It occasions no pain, and no perceptible redness. The paralysis of the pupil comes on in an hour and continues five or six hours. As the action of a small quantity of the extract applied topically is so powerful, and so entirely local that only the iris is affected, and not the retina at the same time, he is led to point out the uses which the practical oculist may derive from this fact.

1st. The application of this remedy in cataract affords a certain test whether it adheres to the iris or not. For, by using

* Ophthalmalogische Beobachtungen und Untersuchungen, St. I. Bremen, 180†.

the hyoscyamus we can make the examination with much greater accuracy, than by the former mode of opening and shutting the eye; because in the latter way we must examine quickly, and in a dull light, whereas, by using the hyoscyamus, we may do it with the greatest deliberation, and in the brightest light.

2dly. The application of this extract enables us to make the most accurate investigation of the nature of the cataract, as it may thus be examined to its utmost extent and in the clearest light. It also assists us in the diagnosis of the capsular and lenticular cataract, of the fluid and firm cataract. It also appeared to Professor Himly to be of service in a still more important point of the diagnosis. For experience has taught him, that the patient affected with cataract, seeing coloured points and bodies, does not always make the prognosis of the operation so serious as was formerly supposed: for this does not always arise from a defect of the retina, but sometimes from the nature of the opake lens. If these appearances arose from a particular refraction in the lens itself, then they would be diminished by the dilatation of the pupil, as the rays of light would be transmitted not only by the nucleus of the cataract, but also by its more transparent part: if, on the other hand, they proceeded from a disease of the retina, the dilatation of the pupil would not lessen them but rather increase their number, as more light would then be transmitted to the retina.

3dly. It proves a palliative remedy in common cataract, as, by its local application, we can produce that state of the iris most favourable for the vision of such patients in a greater degree, and in the bright light of day. But he is unable as yet to decide whether it may be applied so constantly, and so frequently repeated, as to make the dilatation of the pupil permanent, at least during the day, without being hurtful, as he has never used it so constantly. The iris might be for ever deprived of its contractile power, and a *mydriasis e consuetudine* produced, which would be very hurtful in the event of an operation for extraction being to be performed. On the other hand, in patients who could not bring themselves to have the operation performed, or in whom it was inadmissible, this paralysis of the pupil, by the continued use of the remedy,

would be very desirable. Farther, perhaps, from its constant use, its action might extend deeper in the eye, even to the retina, and thus not only a paralysis of the pupil, but even an amaurosis might arise; although this is not so likely to happen from the weaker hyoscyamus, as from the more violent remedies, the belladonna, laurocerasus, &c. But if we should not wish to employ the hyoscyamus so often as to keep the pupil constantly dilated, or if, from its repeated application, we were afraid of an incipient paralysis, there may be situations in the case of blind persons, in which it would be of very great importance to them to see clearly for a few hours, or even a few minutes.

4thly. This remedy procures vision in many cases of opacities of the cornea; as when the opacity is chiefly situated immediately before the pupil, and prevents the rays of light from falling on the retina, although the cornea is sound in other places. The hyoscyamus here forms an artificial pupil without an operation, by enlarging the pupil, and allowing the entrance of the rays of light at the side of the opacity.

5thly. In many cases the application of the hyoscyamus facilitates the operation for cataract; when, for instance, even after a sufficiently large incision, the cataract does not pass out, from the pupil being too much contracted, and remaining so, though the eye be left at perfect rest. In this case, however, he recommends the precaution of not operating during the greatest dilatation of the pupil, as there would be great danger of causing a prolapsus of the vitreous humour, as it would receive too little support from the iris. He therefore allows the greatest effect to be over, and operates when the pupil has already contracted, and the iris acquired a slight degree of motion. The application of the hyoscyamus will also prove beneficial, if we operate according to Beer's method,* as the cataract, passing out along with its capsule, requires greater yielding of the pupil; and if partial adhesions of the iris to the capsule are to be separated, the wider the pupil, the more safely can the necessary means be used for their separation;

* This mode is very accurately described in the *Encyclopedia Britannica*, article *Surgery*.

and likewise, if the capsule is opaque, it can be more completely destroyed if the pupil be previously in a state of dilatation, and the danger of wounding the iris with the knife, in a case of a very flat cornea, would thereby probably be diminished.

6thly. The dilatation of the pupil by the hyoscyamus, would be of great use in Conradi's* method of effecting the absorption of the cataract by opening the capsule; as, in this case, the success depends entirely on the free access given for the aqueous humour to pass to the lens,—consequently, the capsule must not be opened merely in one small point, but a large incision must be made in it, which can be readily done if the pupil be previously dilated.

Lastly. The local application of the hyoscyamus is particularly useful in the contraction of the pupil, which is not accompanied by an adhesion of the iris to the capsule.

In calling this state of the iris a paralysis, Himly wishes to be understood to mean nothing further than that the stimulus of

* From the well known fact of the crystalline lens being often gradually absorbed, whether it be of a hard or soft consistence, if the capsule is opened, and the humours allowed to come into free contact with it, Conradi was led to propose the following simple operation. "A small lancet-shaped cataract needle is introduced through the cornea, exactly as the knife in extraction, only a very little farther distant from the iris. The point is passed through the pupil, and when the capsule is sufficiently opened, the needle is withdrawn from the eye, which is bound up loosely for two or three days, as in general, after that time, so slight a wound of the cornea is quite imperceptible, and then we wait for the absorption of the cataract. The needle does not require to be quite so long as Richter's cataract knife, and it should not be more than a line and a half, or two lines in breadth. Its thickness should be very small, merely to give the blade a sufficient degree of firmness; it must be sharp on both sides for nearly one half of its length." Conradi adds, "It is unnecessary to dwell on the evident advantages of this operation; it is much more easily performed than any other. From this very slight and trifling wound of the insensible cornea, no bad symptoms are to be dreaded, which partly occur during extraction and depression, partly follow after these operations. If, after eight or twelve weeks, the cataract is not absorbed, any other operation may be performed as easily as if this puncture had not been made. The patients have lost nothing but the time; and as they have in general been many years blind, it is not of much consequence, a few weeks, more or less, in order to make the trial of freeing them from their disease by a safe and easy method."—See Arnemann's *Magazin für die Wundartzneiwissenschaft*, 1 B. 1. St. Göttingen, 1797.

light is then incapable of exciting the usual motion, which it was enabled to produce only a short time before, and which is not prevented by adhesion to the capsule, or rather by morbid affections of the iris.

Soon after the publication of Professor Himly's observations, his work was translated into French; but, by a mistake of the translator, *hyoscyamus* was rendered *belladonna*, and in consequence of that error, various experiments were made in Paris with the latter substance. Dubois employed it in the clinical school on a patient who had a very small pupil. The lens passed out with the greatest ease, and he did not find Himly's caution necessary respecting the danger of a prolapsus of the vitreous humour. In this experiment, the pupil contracted immediately after the lens had passed out.

The late Professor Schmidt of Vienna made various experiments, both with the *hyoscyamus* and *belladonna*, externally and internally. He found that the dilatation of the pupil does not take place in every case, though he was unable, from the small number of his experiments, to decide in what cases it takes place, and from what cause this difference arises. The death of that eminent oculist has prevented the prosecution of these investigations; but I have been enabled to collect the following account of some of his experiments.

In the month of May, 1803, he operated on twenty-nine patients of both sexes, affected with cataract, in the general hospital at Vienna; on twenty eyes by extraction, and twenty-two by depression of the lens. Of these twenty-nine persons, twenty-six recovered their sight. Eight were selected as the subject of his experiments. In five he tried the application of the solution of the *hyoscyamus* four hours before the operation; in three he used the inspissated juice of the leaves of the *belladonna* as many hours before the operation. The phenomenon of the retraction of the iris, (dilatation of the pupil) occurred in all the eight patients, but the degree of the dilatation was different in each individual. The difference of age and sex had no influence on it.

Of these eight patients, he operated on three eyes with the couching-needle, through the sclerotic and choroid coats, and

six by extraction through the cornea. Of the three that were couched, in a woman the iris expanded completely during the puncturing with the needle, and the pupil assumed its smallest dimensions. Of the six operated on by extraction, the same phenomenon was observed in one woman and one man; and in two others, the expansion of the iris evidently took place, but was not complete. To one of these three, where the complete expansion of the iris came on during the incision of the cornea, the belladonna was applied. Of these nine cases, only one was attacked with iritis after extraction, and consequent closure of the pupil.

Of the twenty-two eyes operated on by extraction, there were only two where the cataract was followed by a slight effusion of the vitreous humour, and this only occurred in the eyes subjected to experiment. It ought also to be observed, that this protrusion of the vitreous humour occurred without any strong pressure having been applied to the eye-ball; that the cataract was purely lenticular, and there was no unusual adhesion of the capsule; and lastly, in both cases, the belladonna had been used. Professor Schmidt lastly remarks, that, in all the six patients, it appeared to him as if the cataract was more *unwilling* to come out, (if the expression may be allowed); and that he was convinced, that neither the size of the incision, nor of the opening of the capsule, nor any sort of adhesion, could have the most distant share in producing this circumstance.*

I have been induced to give very copious extracts from these works, on account of the difficulty of procuring them, and the importance of the information to the practical surgeon which they contain. Of late, I have generally used the solution of hyoscyamus in preference to the belladonna, as in some cases of acute inflammation of the eye the belladonna seemed to excite pain. In one case of cataract, I have occasionally used the hyoscyamus as a palliative cure for more than a twelvemonth, and have not observed any bad effects from its continued application. However beneficial the dilatation of the pupil may be in the operation of depression, or of breaking down the lens in

* See Ophthalmalogische Bibliothek von Himly und Schmidt, St. 11. B. 1. Jena, 1803.

congenital cataract, it does not appear to me that it would be equally so in the operation of extraction. For I have always found that the incision of the cornea was made with less risk of wounding the iris, when the pupil was contracted; and I have never met with any difficulty in getting out the cataract, by a gradual and continued pressure on the eye. The iris being expanded, would bring it immediately under the edge of the knife, and make it more apt to be wounded, or it might fall forward after the knife had cut itself out, an accident which happened in two cases where I operated, but was not attended with any bad consequence. In these two cases, I found the application of the hyoscyamus of great use in drawing the iris back into the eye from between the edges of the wound, which then healed, and both patients now enjoy very perfect vision. I have also used it in cases of protrusion of the iris through ulcers of the cornea, the iris retracting, and allowing the ulcer to cicatrize. I very lately also used it with singular advantage in the following case. A woman about forty came to me with the pupils of both eyes very much contracted, the iris adhering firmly to an opake substance behind; but the opening was so small as to make it impossible to ascertain the nature of the opacity. She had lost the sight of the left eye for nearly five years; and the vision of the right was much impaired. In both eyes the affection came on subsequent to violent rheumatic attacks in the head and neck. I conceived, that if the hyoscyamus was applied to the eye, and the adhesions separated, the pupil would dilate. Accordingly, I applied the solution an hour before, and then introduced the curved cataract needle, about two lines behind the cornea. As soon as the adhesions towards the inner angle of the eye were separated, the pupil sensibly dilated, and the point of the needle was seen more distinctly behind it, and was moved about with more freedom, in order to separate the rest of the adhesions. After the operation, the patient could distinguish the wall of the room.

I have always used the hyoscyamus dissolved in water, in the proportion of a drachm to the ounce. In Drysdale's case, I tried the extract merely softened with water, but did not find that it occasioned a greater dilatation than the solution.

The difficulty of procuring the belladonna, may also be mentioned as a reason for recommending the hyoscyamus. I lately applied to two of the principal apothecaries here, and could not get any of the recently prepared extract.

Edinburgh, November, 1812.

Case of Inguinal Aneurism Cured by tying the External Iliac Artery.

By WILLIAM GOODLAD, Surgeon.

[From the Edinburgh Medical and Surgical Journal, for January, 1812.]

IN the beginning of June I was consulted by John Ramwell, a stout muscular man, of a spare habit of body, a florid complexion, and about 41 years of age. Upwards of three years ago, the patient first perceived a swelling not much larger than a pea, on the inside of the right thigh. It caused very little pain or inconvenience, and did not increase so as to alarm him, till after his recovery from a severe dysentery, nine months ago. From that period, its increase has been rapid. It is now of the size and shape of a pint bason, with its rim inverted; although six months ago it was not, by the patient's report, more than one fourth its present size. The tumor was situated at the superior and anterior part of the thigh, extending along Poupart's ligament, to within two inches of the anterior superior spine of the ilium, and about four inches down the thigh. It is dense, circumscribed, and appears to sink deep amongst the muscles. If grasped firmly, a dull pulsatory motion is clearly distinguishable. This pulsation is rendered more evident by bending the thigh upon the pelvis; and by a continuance of the pressure, the swelling becomes much less prominent. The artery passes along its most interior surface, and gives to the finger the peculiar thrill characteristic of aneurism. It retains this character, till it passes through the adductor femoris to descend into the ham, when it is no longer to be traced.

A Bread-baker by trade, the patient has been accustomed to occasional great exertion, in carrying loads of flour up several sets of stairs. But his employment, during the last seven years,

has been chiefly performed in a sitting position; and requires almost no exertion. When I apprised him of the necessity of an operation, I learnt that he had already consulted two surgeons, one of whom advised the removal of the tumor by extirpation; the other had recommended the frequent application of blisters to it. This diversity of opinion was attended with a proportionate want of confidence in my patient, who chose to defer it; and, as his pulse was good, his appetite tolerable, his bowels regular, his general health, in short, little impaired, I gave him general directions, and desired to see him again ere long.

At the end of a fortnight the swelling was much in the same state, though somewhat larger. It produced a numbness in the thigh, and the leg towards evening began to swell. A troublesome cough now came on, which, with a few days exertion, produced a more rapid increase. My friend and late master, Mr. Killer of Manchester, who, with my friend Mr. Hamilton, did me the favour to examine my patient, entirely coincided with me in opinion, and the operation was consented to when the cough was remedied. For this purpose opium with digitalis was administered, and rest, low diet, and occasional laxative medicines recommended.

From this period to the latter end of July, the tumor increased so rapidly, that it was thought adviseable to delay the operation no longer, though some cough still remained, and though the temperature of the atmosphere was oppressive. Accordingly, it was performed on Tuesday the 29th of July, in the presence of Messrs. Killer and Hamilton, whose very friendly attention on this and every other occasion I have great pleasure in being able to acknowledge.

An incision, upwards of three inches in length, was made through the integuments, beginning at the upper margin of the tumor, about three inches from the symphysis of the pubes, and carried almost directly upwards. In the dissection of the cellular membrane, covering the aponeurosis of the external oblique muscle, several arteries were divided, which supply the adjacent glands. These vessels were immediately secured, and more than two inches of the tendinous expansion exposed. its fibres were carefully divided and dilated downwards, by the

probe-pointed bistoury induced upon the finger. The artery was now clearly distinguished by its pulsation. The fibres of the external oblique, with the margin of the internal and of the transversalis muscles, were also divided upwards, to allow sufficient space for the two fore-fingers of the left hand to be placed in contact with the arterial sheath.

I endeavoured to detach the fascia, so as to be enabled to pass my finger round the artery. In this attempt considerable difficulty was experienced. But, by keeping the artery firmly in its situation upon the psoas muscle, with my finger and thumb in contact with it, I succeeded in passing the eyed end of a probe (about half an inch of which was bent to a right angle) under the artery, from within outwards. The shaft of the probe was gradually bent likewise to facilitate its turning in the wound. A double ligature being put through the eye, the probe was re-drawn. The upper ligature was tied as high as possible by Mr. Killer. The pulsation in the tumor immediately ceased. The lower ligature was also tied, but as the space between the ligatures did not appear to warrant the division of the vessel, it was left entire. The integuments brought into contact, were secured by a couple of stitches, stripes of adhesive plaster were applied, and a roller passed round the whole. The patient was put to bed with the thigh bent upon the pelvis. The temperature of the limb had been kept up during the operation, by a flannel roller applied around it. This was still retained; the whole limb felt comfortably warm, and he had little pain. At nine o'clock in the evening, I found his skin cool, tongue somewhat furred, pulse 100, wound easy. The leg and thigh quite as warm as on the opposite side, foot a little colder. He has had a few short slumbers, and has taken bread, milk and tea. To take an opiate at bed time.

Wednesday, 7. A. M.—He complains of much pain in the back, occasioned by continuing in the same position, which prevented him from sleeping. He was therefore turned on his back, and the knee bent and supported by pillows, as in fracture of the thigh. He has occasional throbbing, some thirst, pulse 90, skin cool. The leg and thigh quite as warm as the other, the toes nearly so. To take lemonade for his common drink. One P. M.—He has had an hour's sleep; cough somewhat

troublesome; pulse 100; tongue furred in the middle; a little soreness in the belly. A gentle laxative was given.

At nine o'clock P. M. the limb was hotter than the healthy one; pulse 104, and fuller. He has had considerable pain in the head, which continued till seven o'clock, when he had an hour's refreshing sleep, and awoke better. The pain in his back continues troublesome. He has coughed little, and expectorates freely. No pain, or tension, in the abdomen; tongue moist, though furred; urine hot, but not high-coloured; no stool.

R Sulph. magnes. ℥iij.

Vin. antim. gtt. x.

Tinct. sennæ, ℥ij.

Aq. puræ, ℥i. M.

To be taken immediately, with a saline draught every four hours.

The heat of the atmosphere has been quite oppressive.

Morning visit, (second day.)—He passed the night with only an hour's sleep; he complains much of his back, and a slight headache; face flushed; his skin hot and dry; pulse 116, rather hard; no tension in the abdomen; cough troublesome in the night; water high-coloured, and scanty; no stool. To six drams of infusion of sennæ, and a dram of the sulphate of magnesia, half an ounce of the liquor of acetite of ammonia and ten drops of antimonial wine were added. To be taken every three hours until the bowels were opened.

Noon visit.—He had a motion soon after I left him in the morning, and several hours comfortable sleep in the afternoon. Pulse 102, soft; skin cool; less thirst; back easier; cough still continues. The whole limb is comfortably warm; he has perfect sensation and power of motion in the toes; belly quite easy. To continue his medicines till he has another stool.

He had some return of fever towards evening, but, as it subsided, he had two hours sleep, and was much refreshed. Pulse 108; head easy; tongue moist and clean; skin cooler; urine hot and high-coloured. He has had another stool, and has taken plentifully of pottage, butter-milk and tea. To a dose of his purgative medicine were added twenty drops of laudanum, to be taken at bed time.

Friday, August 1st, (the third day after the operation.)—The dressings are removed for the first time. The inferior half of the wound is a mere line, the superior half nearly so. There is a slight blush upon the edges, but no pain or tenderness; discharge moderate and healthy; tongue clean and moist; limb warm and sensible; appetite good; had a stool this morning.

Saturday.—He has slept well the two last nights, and has taken broth, pottage and milk; pulse 84; tongue clean; no thirst; bowels regular; limb comfortable. The wound is somewhat separated above the upper ligature; discharge copious but quite puriform. The opiate to be repeated.

Sunday, (the fifth day).—The wound continues to look well; discharge copious; the ligatures from the small vessels which were divided in the operation have come away; the stitches, beginning to ulcerate, were removed also; limb warm and easy.

Monday, (sixth day).—Much as yesterday, except that his cough was troublesome in the night. He has also been much fluttered by a sudden noise at the door, but is now calm; the wound looks well, though a slough lines the opening round the upper ligature; discharge somewhat increased, but of a proper quality; pulse 82; appetite good. To take animal food once a day, and a pint of porter in the twenty-four hours.

Tuesday.—A week has elapsed since the operation; he continues to go on well; his general health is good; bowels regular; pus healthy; the lower half of the wound continues united by adhesion, except where the stitches were inserted. The upper half of the wound is not more than $\frac{1}{4}$ of an inch in breadth; granulations healthy. The slough surrounding the upper ligature is in part removed, and little pain is complained of, though considerable pressure be applied to the parietes of the abdomen.

Wednesday.—The patient has been taking, night and morning, during the three last days, pills containing half a grain each of opium, digitalis, and calomel, and three grains of rhubarb; his cough is now better, he sleeps well, and had a stool this morning; pulse 86; appetite good; discharge yet considerable, but healthy.

Friday.—The slough lining the aperture which I have before mentioned, is come away; discharge yet copious; has a stool daily; no pain; limb comfortable; pulse 84, directly after dinner.

Sunday.—Continues to improve; discharge not so copious.

Monday.—Much as yesterday; discharge greatly abated; granulations now closely surround the upper ligature; the lower ligature has created little irritation; the wound is united around it; the pulse during the last three days has ranged from 74 to 80; tongue clean; bowels regular; limb easy.

Tuesday, (the fourteenth day).—The skin over the aneurismal tumor can be drawn up nearly two inches, though before the operation it was quite tense; its contents are fluid; the wound heals.

Tuesday.—The ligatures came away yesterday; the patient is allowed to set up in bed, and to move the limb occasionally; appetite continues good; his bowels regular.

It will not be necessary to transcribe further the daily progress which the patient made towards recovery. At the end of three weeks, the wound was little larger than a pea; the discharge was trifling. He was now allowed to get out of bed, and walk about the room; though very weak, there was no perceptible difference in the strength or feeling of the limbs. The numbness in the thigh, which had become troublesome before the operation, still continues. The tumor decreased rapidly, particularly towards the spine of the ilium. At the end of a month, the swelling has decreased at least one third; the wound is perfectly healed, and the patient increases in strength daily; he is now able to take considerable exercise, having walked nearly two miles in one day; the limbs are of an equal strength and thickness, and the numbness in the thigh quite removed.

I much regretted that, in this operation, I could not adopt Mr. Abernethy's improved method of tying the artery, to its full extent, since I could not separate the vessel from its connection, sufficiently to admit of its division, without a degree of violence, which would have more than counterbalanced the danger of a short space of the tube (between the ligatures) being left separated from the surrounding parts; yet I am decidedly of opinion, that the chance of success from the operation was diminished by this occurrence. I would, however, in every case, apply a double ligature upon the vessel, since the same process which prevents the accession of hæmorrhage by the application of the upper ligature would appear likely to hinder such an oc-

currence from the lower orifice also; and by producing adhesion of the coats of the vessel at two distinct points, you render the ulcerative process less extensive, and confine it, in all likelihood, entirely to the space between them.

The tumor, at the period of the operation, extended from the anterior superior spine of the ilium, to a short distance from the angle of the pubis; and its apex rose so high, that it rendered Poupart's ligament exceedingly obscure in this space. This rapid extension made me apprehensive that its basis would extend so far under the crural arch, that a sound part of the artery could not be reached without considerable difficulty. This circumstance appears the more likely to take place, when we consider the powerful resistance which the fascia of the thigh presents to the increase of the tumor beneath it, and the comparative facility for its ascent upwards, where it meets with resistance chiefly from the fascia iliaca of Mr. Cooper. That the proper sheath of the femoral vessels, in its natural state, can contribute little to prevent such an event, will be easily conceived, particularly if we agree with the same skilful surgeon, that all crural herniæ are protruded, in the first place, into this sheath, and that the openings for the passage of the lymphatic vessels are large enough to allow their exit from it.

This event took place in Mr. Abernethy's second case; and that it does not more frequently occur, is owing to that law which Mr. Hunter first noticed, by which extraneous bodies approach towards the surface, rather than in a lateral direction, and by the pressure of the projected fluid producing condensation of the parts around it.

The probability of the aneurismal sac participating in the irritation which the presence of the ligatures may produce, will be in proportion to their contiguity. Mr. Abernethy, therefore, very judiciously directs, that the artery be tied as high as possible, though the difficulty of reaching it is thereby increased, and though in such cases the surgeon must lay aside the knife, as soon as he is able to reach the arterial sheath, and conduct the future steps of the operation by the finger, or by a blunt instrument introduced under the artery.

As the ulceration of the aneurismal sac would, in any case, produce so much constitutional irritation, as would render this

operation doubly hazardous, (and from the large size which it attained in Barnwell's case, almost certainly fatal,) it cannot, I think, be too strongly recommended to proceed to the operation at as early a period as possible; that is, as soon as the flow of blood through its natural channel, and the consequent increase of the collateral branches, appears adequate to the support of vitality in the limb.

It is pleasing to reflect, (because it shows the favourable progress of this branch of surgery), that though Cheselden trusted so little to this power, that he had difficulty in believing the event when it had taken place in the arm, the judicious boldness of Mr. Abernethy has clearly demonstrated, that the operation may be performed with safety in any situation, where anatomy enables us to reach a healthy portion of the artery.

That the supply of blood was adequate to the proper nutriment of the limb, was in this case evident from the day of the operation; although the artery passed too near the surface of the tumor, and its pulsation downwards was too easily traced to admit a supposition that the circulation, though it, was much impeded. The absence of extensive œdema confirms this opinion, and is easily accounted for, by the sac being almost entirely external to the femoral vein.

The secondary fever was much less than could have been expected, especially as the temperature of the air in the four or five first days after the operation amounted to 70° in the shade.

Bury, Lancashire, Sept. 20th, 1811.

P. S.—Since this operation I have heard of a similar case in this neighbourhood: the patient was allowed to die without any effort to save him by an operation.

A Case of an Ununited Fracture of the Thigh, cured by sawing off the Ends of the Bone. By GRIFFITH ROWLANDS, Member of the Royal College of Surgeons, London, Senior Surgeon to the General Infirmary, and Surgeon to the Lying-in Charity, Chester.

[From the Medico-Chirurgical Transactions, Vol. II.]

JOHN THOMAS, aged 53, a tall strong man, was knocked down by the falling of a tree, which broke his thigh nearly in its middle. A bone-setter in the neighbourhood was called to his assistance, who bound up the limb and continued attending him *many weeks*. The poor man having lain in bed for a longer period than was considered necessary by his friends, in such cases, took the opinion of a regular practitioner, who undeceived him as to his prospect of recovering, and advised him to place himself under my care.

The patient being rather unwilling and very unequal to undertake a journey of forty miles to Chester, contented himself with wearing a strong leathern case round his thigh, which enabled him, with crutches, to move from one room to another. However, being at length completely wearied with his inactive life, and his little farm greatly wanting his attendance, he was brought in a cart and admitted into the infirmary on the 28th of October, 1806, five months after the accident. The thigh at this time was considerably wasted, four inches shorter, and the fractured ends of the bone so far separated, with a fleshy substance between them, as to make it impossible to bring them together.

He was a man possessed of an excellent understanding and firm resolution. I stated to him that there was a chance of curing him, by sawing off the ends of the bones; but, in attempting to do so, I might unavoidably cut an artery, that would make it necessary to take off his thigh to save his life. He submitted readily to the experiment, requesting, if he could not be otherwise relieved, that the limb might be taken off. The patient being ordered for some days to live on the milk diet, and his bowels being properly attended to, the operation was performed, on the 12th of November, in the following manner.

A tourniquet being applied, but not tightened, I began an incision three inches and a half above the fracture, and continued it between the rectus and vastus externus muscles, to the same length below it. A few strokes of the scalpel laid the bone bare, and the *upper* portion was easily separated from its connection with the surrounding parts. The end of the *lower* portion of bone was buried much deeper amongst the muscles, and a firmer adhesion had taken place; and I was obliged to proceed very slowly and cautiously in this part of the operation, on account of the extreme difficulty of avoiding an artery, which beat strongly against my finger as I directed the scalpel. Having thus far succeeded to my wishes, I passed a strong plate of tin behind the denuded ends of the bone, and being provided with every kind of saw likely to succeed in such a case, I judged the business would be easily finished. In this I was disappointed; for after some disturbance to the patient and much fatigue to myself, I found it necessary to make an incision across a great part of the vastus muscle, by which means I was enabled, with a common amputating saw, very easily to take off the ends of the bones. The upper portion being first removed, I had an extension made on the limb, by which I ascertained that two inches of the lower portion was to come off. There not being a single artery to tie, the lips of the longitudinal wound were brought together with strips of adhesive plaster, and the lateral incision somewhat approximated by the same means, but left sufficiently open to afford an easy vent to the discharge from the inside of the wound. Pledgets of cerate on lint and tow were next applied, with compresses of soft linen retained with a tailed bandage. A long sort of strong splint, reaching from the buttock to the foot, with a joint at the knee, to vary the posture, supported the limb underneath, and a common wood splint on each side, and one on the top of the thigh, made the whole secure. In this state the patient was laid in bed on his back, and by the aid of an opiate passed an easy night.

It would be needless and tiresome to enumerate the different remedies employed in this case, which the particular symptoms required. The wound was dressed on the 16th, and looked well, the bones being perfectly opposite.

The discharge was considerable, and continued so for many weeks; during which time, I found the lateral incision of great importance, as a convenient drain to the discharge, and I recommend it to be adopted in all similar cases. The wound was completely healed in three months; but the reunion of the bone was weak for a long time. On the fourteenth of April, 1807, he returned home, and soon was able, with a stick and a high heeled shoe, to follow his usual occupation.

He died of a fever about a year ago.

Though I have several times performed all the principal operations that occur in surgery, and very often many of them, I confess this far surpassed any thing I had ever undertaken or witnessed, and I am doubtful as to the propriety of recommending it to be done by others.

History of Three Persons who were nearly Suffocated, and of One who Perished, from the irrespirable Gases arising from a Coal Fire. By DAVID KING, M. D.

[From the Edinburgh Medical and Surgical Journal, for April 1811.]

ON Tuesday, 13th November last, a fire was kindled in the hold of a vessel lying in this harbour, in order to dry some wet sails, and to make it more comfortable for the people that were doing some work there. In the evening the fire was perfectly extinguished, and the captain gave strict orders for the hatches to be left off, till about the time the crew should go to bed. His injunctions, however, had unfortunately not been attended to; the hatches were put on, and the vessel was shut up till eleven at night, when the crew got into their usual births. The mate slept in the cabin, and two boys, M'Iraith and M'Dillon, and an elderly man, Thomas Leslie, slept in the forecastle; both of which stations are separated from the hold only by a partition of wood. None of the people felt any thing disagreeable; and on that account they shut up closely both the cabin and forecastle. Leslie slept in the same birth with M'Dillon, who unfortunately perished, the former at the fore and the latter at the back

part of the bed; and the other boy, M'Iraith, lay in a bed by himself.

The captain was surprised to find, when he came on board, about half past seven the following morning, the crew all in their births, and the vessel shut up. He went to the mate, to inquire of him the cause. The mate, who was very listless, told him that it was not drunkenness; but he could not account for the great debility and pain he had in the small of his back, and in his lower extremities, and begged the captain would allow him to remain in bed a little longer. The captain suspecting, notwithstanding the mate's assurances to the contrary, that it might be the effects of drunkenness, gave his consent. He then went down to the forecabin, and there he found M'Iraith lying upon the floor, who uttered a peculiar kind of cry upon touching him, and the other two in their births. He, however, did not at all examine them minutely, but found them unable to speak, and, as he supposed, dead drunk. The captain related the conduct of his crew to some seafaring people on the quay, and prevailed upon them also to go down, who all considered the crew in a fit of intoxication; and they thought, therefore, the best plan was to allow them to sleep it out.

Accordingly, they were left from that time till half past one o'clock P. M., when the captain suspecting something very remarkable in their drunkenness, from their being all in a similar state, and none of them getting any better, thought it prudent to have them brought on deck.

But it was now too late; for in one, M'Dillon, the vital spark was gone, and his bed-fellow, Leslie, was nearly lifeless. The boy, M'Iraith, was scarcely able to utter a strange cry, and the mate, who was in the cabin, to be made sensible of his situation.

The whole were removed to a house a few paces from the quay, and in a few minutes I saw them.

M'Dillon had great suffusion of the face, neck, and upper extremities, which were tumid, and pitted on pressure. The eyes were turgid, but retained nearly their lustre; the lips were black, and the teeth of the lower jaw immovably clenched against those of the upper. The extremities were cold and rigid; the fingers and toes were curved inwards, as in severe epileptic fits;

the nostrils seemed dilated, and drawn a little upwards, and were filled with a thin bloody froth.

The windows and doors of the room were thrown open; the lungs were repeatedly dilated, by means of a quill put into one nostril, whilst the other and the mouth were shut, and pressure was made upon the larynx, to prevent, during the inflation, any air from getting down the œsophagus. By this artificial respiration, a great quantity of a mucous froth came from the nostrils. A vein was opened, but no blood came. Frictions, and the application of warm irons and flannels were also had recourse to; but every attempt to restore animation proved fruitless.

Thomas Leslie had also considerable suffusion of face; his eyelids and mouth were closely shut, and his breathing, which was interrupted with sobs, had a peculiar rattling noise. His pulse was small, and about 96; his toes and fingers curved, his joints all inflexible, and his extremities somewhat cold.

Cold water was dashed upon his face, and hartshorn rubbed about his mouth and nostrils, and volatile salts were occasionally applied to his nose; all of which caused him, after a little, to corrugate his face, and to make fuller inspirations. Warm irons and flannels were applied to his lower extremities, and an enema, composed of $1\frac{1}{2}$ drachms of hartshorn, in about $1\frac{1}{2}$ gills of warm water, was administered with considerable difficulty, from the contraction of the sphincter ani, and the rigid state of the thighs. About eight ounces of blood were taken, without any apparent effect on the pulse. His mouth was forced a little open with the end of a spoon, and a little warm wine and water given, but was swallowed with considerable difficulty. As soon as the warm bath was gotten ready, which was in half an hour, he was immersed in it, with the head a little raised, for about ten minutes, when his pulse became fuller and stronger, and his joints more flexible. He seemed, however, insensible to every thing but to the volatile salt, when applied to his nostrils, or to cold water thrown upon the face, both of which were occasionally employed. In the evening, I found his pulse was rather fuller, and 84, his respiration less noisy, and his limbs more flexible. A stimulant enema, of senna and sulph. magnesiae was administered, by which one stool was produced, involuntarily discharged. A common enema was administered in three hours after-

wards, which procured one scanty stool, also involuntary. The report which the attendants gave next morning, 15th, was, that they had gotten him to swallow some wine and water, and soup occasionally, but that he was apparently insensible to every thing that was going on about him; that he never once attempted to open his eyes, and that he was frequently bedewed with a warm sweat, which was general over the body. As he now swallowed with considerable ease, an infusion of senna was given him at intervals, which not operating in six hours, a bolus of jalap and calomel was ordered. In about three hours after, he had two or three plentiful stools, which were involuntarily discharged. About ten o'clock at night, his breathing became very laboured, in consequence of which I was sent for. I perceived his features were now much shrunk, his mouth was very open, pulse 120, and weaker, respiration hurried, and he lay perfectly extended on his back. There was no coldness of his extremities, which might have been accounted for from their being constantly surrounded with warm irons and flannels. Sinapisms were applied to the inside of his thighs, and cloths, soaked in vinegar and water, to his head. In less than an hour he began to draw up his limbs and appeared to feel some uneasiness from the sinapisms, which were taken off, and applied at intervals only. During the night he took some bread-berry, and towards the morning of 16th, he understood what was said to him, and, for the first time, raised one of his eyelids; but had no recollection of what had passed from the time he went to bed on 13th. His bladder was very much distended with urine, but he was unable to get any passed, though he had made several unsuccessful attempts, and had rendered several liquid stools. A catheter was introduced into his bladder, $5\frac{1}{2}$ lbs. of urine, of its natural appearance, were drawn off, which gave him great relief. This operation had to be repeated for three or four days afterwards; and as his stools, though frequent, were black, and accompanied with tenesmus, he was frequently purged, and immersed in the warm bath at night.

—— M'Iraith, who was in another apartment of the house, was blooded soon after he was brought out of the vessel. I saw him soon after the bleeding, which had been to the extent of 12 or 14 ounces, and his pulse was then scarcely to be felt. He

looked wildly around him, raised himself frequently, as if he had some difficulty of breathing in the horizontal posture. He refused every thing that was offered him to swallow, and spoke incoherently. He was immediately put into the warm bath, and was kept immersed for ten minutes, when his pulse became fuller and stronger, and he now swallowed a little wine and water. In an hour or two afterwards, he had a bolus of jalap and calomel, which operated fully in three hours after it had been swallowed, when he found himself very easy, and his skin assumed its natural appearance. I did not see him after this; but I understood he had a slight discharge of blood by stool, for a few subsequent days.

The mate also lost a few ounces of blood, which he bore perfectly well. He had a bolus of jalap and calomel, from the operation of which he found much relief. He was able next day to walk about, but felt weak, had slight head-aches, a moderate diarrhœa, and a trifling discharge of blood from his nose and lungs occasionally, for the two or three following days.

In the above cases, I think we have examples, where the noxious gases arising from combustible matter, have entered the lungs, and have been taken into the course of circulation.

We must suppose this from the length of time during which the people were exposed, and from these gases being in no considerable quantity, only gradually penetrating through the seams of the partitions, which separated the cabin and fore-castle from the hold, where the fire had been burning, and the wet set to dry.

The most prominent external appearances in them were, the great lividity of the surface, the inflexible condition of the extremities, the fingers and toes curved, the mouth shut, the nostrils dilated, and the great debility of the animal functions. It is impossible to say, from the three cases of the persons who were sleeping in the fore-castle, whether the young or the old, the weak or the robust, resist the deleterious effects of these gases longest. For M·Dillon, aged 17, healthy and robust, lay at the back part of the birth, which was enclosed on all sides, except at the fore-port, with boards, where Leslie, aged 53, lay. The latter would inhale the gases much diluted, whilst the former must have received them more concentrated. M·Ilraith, aged

11, recollected his getting up, sometime during the night, to take a drink of water, but was unable to speak, or get up the ladder, or even back into his bed, and had lain therefore on the floor till the morning, when he was lifted into his birth. In an hour or two after, he had been taken out of bed by his mother, who washed his hands and face with cold water; and, little suspecting the real cause of her son's illness, had again put him into his bed. The mate, aged 32, lay in a more roomy apartment, the cabin, where the pure air would get access by the funnel for the chimney, and where the gases must even have been less in quantity, from the partition which separated it from the hold being stronger and more complete.

I am extremely sorry that I was denied permission to open the cranium and thorax of the body of M'Dillon, by which the true state of the brain and lungs could have been ascertained.

I have omitted to say, that the above persons were more than once visited by Dr. Patterson and Mr. Whiteside of this town, with whose approbation I followed the treatment I have just related.

Ayr, Sandgate, 10th Dec. 1810.

SELECTED REVIEWS.

Dissertatio Inauguralis de Effectibus Arsenici in Varios Organismos, necnon de indiciis quibusdam veneficii ab Arsenico illati; Quam præsiede, C. F. Kielmayer publice defendet, Jan. 1808. Auctor GEORG. FRIED. JAEGER, Stuttgardianus, 78 p. 8vo. Tubingæ.

[From the Edinburgh Medical and Surgical Journal, for January, 1811.]

WE have not seen the original of this inaugural dissertation; but a very full analysis of it has been inserted in Gehlen's Chemical and Physical Journal, by Dr. Siegwart, which contains several original observations, worthy of being generally known.

Dr. Jaeger has examined the effects of arsenic on all classes of living organized bodies, vegetable and animal, and had an opportunity of observing its effects upon a girl twelve years of age, who was poisoned by drinking water which had stood upon the black oxide of arsenic (*cobaltum officinarum*).

Most of his experiments were made with a solution of white oxide of arsenic in water, in the proportion of one to sixteen, or with a solution of arsenic acid, in the proportion of one to four. The latter, diluted with water, operated upon all organic bodies in the same manner as the former, but more quickly and obviously.

The general conclusions which he has drawn from his experiments on the vegetable kingdom are, that arsenic is a general and pretty quick poison for plants at every period of their life, with the exception, perhaps, of a few of the simplest forms of vegetable existence; that their death was induced by means of the gradual absorption and distribution of the poison by the vessels and cellular membrane, so that the parts died in succession, as the particles of the poison reached them; that the changes which took place in the poisoned plants, were the consequence of the chemical action of the poison, and that the irritability (of the mimosa) seemed to be exhausted before general death destroyed the whole machine.

The author found arsenic also to be a quick and destructive poison to animals, when applied in sufficient doses, and to a proper organ. The death was preceded, in every instance, from the infusory animalculæ up to man, by inordinate motions, and the secretion of lymph was increased most remarkably from the mucous membranes. Frequent fluid stools took place in all classes of animals; in those in which mucus is secreted on the surface, it was remarkably increased, and crabs ejected a great deal of froth from the bronchial openings. The power of voluntary motion and susceptibility for external stimuli decreased, as well as for the stimulus of galvanism, after death; the respiration of those animals which breathe by lungs, became difficult and laborious, and warm-blooded animals experienced extraordinary thirst. In birds and mammalia, frequent and violent vomiting took place, and commonly was the commencement of the scene to which convulsions put an end. Rabbits, however, which ruminate, did not vomit. In other respects, our author did not discover any difference either in the mammalia or birds, between those which lived on animal or on vegetable food. Dogs and cats gave the first indication of their uneasiness, by a change in their voice; but the girl already mentioned made no complaint of pain, not even when she was asked about it. She retained her senses to the last, knew the persons around her, and inquired for what she wanted.

Arsenic exerted the most powerful effects, when it was injected into the veins, or applied to a bleeding wound; next, when it was introduced into the stomach, but less so when injected into the large intestines, which have fewer absorbing vessels. Applied to the sound skin, and to a wounded muscle, if dry, it seldom produced any effect; and animals covered with scales or shells, did not suffer at all from the external application of arsenic. Applied directly to the nerves, it was inert. Lastly, he found that animals were never killed more certainly or quickly by arsenic than when it was injected into the abdomen. But upon this he lays no stress, as the same effects were produced by most infusions. Younger and smaller animals died sooner than such as were older and larger. Birds, notwithstanding their more irritable nature, were less sensible

to its effects than amphibia. A female frog, during copulation, when the irritability is greatly increased, was insensible to a dose which killed it at another time. Tadpoles died sooner than frogs, but the larvæ of flies were less susceptible than the perfect insect.

In whatever way the arsenic was applied, Dr. Jaeger observed after death no change upon the skin, except the paleness, and some blue spots nine hours after the death, upon the girl already mentioned. The gullet, and in birds also the crop, exhibited generally a slight redness, then further down purple-red stripes, more numerous in the vicinity of the cardia; which, as well as the stomach itself, in animals having a soft villous coat to their stomachs, was sometimes of an uniform purple-red colour, and sometimes spotted with it, without any difference from the mode of applying or form of the poison; but the muscular stomach of graminivorous birds shewed no appearance of redness, and in the aponeurotic portion of the stomach of a horse poisoned by arsenic, there were no traces of inflammation, which was otherwise general. The villous coat of the stomach is almost always softened, and as if macerated, and also somewhat swollen; and in general it can be easily torn or rubbed off in pieces with the finger from the coat beneath it. The inflammatory redness is not seated in the villous coat, which remains perfectly white, but in what is called the nervous coat, which is remarkably red, and exhibits every where purple-red warts or eminences; but the author often saw this separation of the villous from the nervous coat, without any inflammatory redness of the latter. These changes continue, though in a less degree, through the small to the vicinity of the large intestines, which is in general free from them, and only contains an increased quantity of effused mucus; but the rectum again is inflamed, and its inner coat swollen and softened. These appearances are not constant, and are very various in degree. Thus, our author discovered no traces of inflammation in the stomach or intestines of a bird, and a rabbit to which arsenic was administered by the mouth, or of another rabbit, into whose abdomen it was injected.

The other mucous membranes were less generally affected,

but our author sometimes found the trachea red and inflamed, and in one instance, the urethra of a dog. The serous membranes, which receive less blood and more lymphatic vessels, are little changed. Our author never observed real inflammation of the peritoneum, but the vessels, and especially the veins of that part of it which surround the intestines, mesentery, and omentum, were always turgid with stagnating blood.

The voluntary muscles were constantly and universally rigid; the limbs sometimes bent, but generally extended; the heart, urinary bladder, gall-bladder, and intestines were rarely contracted, but frequently distended by their contents.

The coats of the blood-vessels scarcely exhibited any change. But the veins, especially of the abdomen, were constantly turgid with much black fluid blood, generally mixed with some flocculi. A similar stagnation is observed in the cavities of the heart, especially of the right side, and coagula are very seldom found in them. Sometimes the lungs are also filled with extravasated fluid, but in general they are perfectly natural. In no other place was extravasated blood observed by our author, but the veins were everywhere full of black fluid blood. In the brain and nerves, there was nothing unnatural, nor in the various absorbent and secreting organs.

The putrefaction of animals seemed neither to be hastened nor retarded by their being poisoned with arsenic, whether they were buried or not. The generation of infusory animals, the production of larvæ and subterraneous vegetation in and about the bodies of poisoned animals, took place as usual. Our author is particular in these observations, because accelerated and retarded putrefaction have been alternately enumerated among the proofs of death by arsenic. However, it may be remarked, that the immediate contact of the arsenical solution, seemed in some degree to retard the putrefaction of the part to which it was applied in sufficient quantity.

Arsenical acid produced exactly similar effects, and in a greater degree.

So much for the *general* effects of arsenic; the following *local* effects were also noted. The green colour of the skin of a salamander was destroyed. The sound skin was seldom at all affected by it. When the arsenic was applied to the

wounded skin, it was never observed after death to be gangrenous or inflamed, was rarely swelled, was generally pale, and, for a considerable extent, the subcutaneous cellular membrane was filled with much stagnant gelatinous fluid. The œsophagus, stomach, and intestines were commonly, though not always, inflamed, when arsenic was administered by the mouth. In the girl already noticed, there was only a slight spotted redness about the cardia, a discoloration of the bottom of the stomach, and a very small brown spot where the villous coat seemed as if superficially burnt. Our author never observed real erosions, ulcerations, and gangrene of the viscera. The peritoneum was not inflamed in those animals which were killed by injecting an arsenical solution into the abdomen. The local application of arsenic generally rendered the muscles white, but seldom inflamed, and caused an increased secretion of serous fluid into the spaces between them. The nerves were not affected, and the blood-vessels very little. In the horse already mentioned, and into whose jugular vein two or three ounces of arsenical solution were injected, and which was put to death twenty-nine hours afterwards, there were only some discoloured spots in the left ventricle. When blood was received into an arsenical solution, the whole mass became black and gelatinous in appearance, then a coagulum formed in the centre, but it remained soft, and not defined, and never acquired the bright red colour on the surface.

We shall not enter into the detail of our author's reasons for his opinion concerning the manner in which arsenic acts. He adduces arguments to prove, that arsenic does not act mechanically by the sharpness of its particles, nor by its local action on the stomach, nor in the manner of the acrid poisons or dephlogisticating substances, nor upon the nervous system; but is analogous to the poison of the viper and ticunas, which act primarily upon the blood.

We shall, however, extract more fully the observations of our author on the proofs of poisoning by arsenic. These are of two kinds. The pathological proofs derived from the symptoms which precede death, the appearances of the body after death; and the chemical proofs derived from the properties of arsenic.

With regard to the first, he thinks it sufficient to mention, that not only several of them are often common in other diseases, and that there is almost none of them which have not occasionally been wanting, and that even several of them have been wanting at the same time. Hence these signs, collectively, only render the poisoning by arsenic, and the death from that cause, probable; certainty cannot be obtained but from the chemical proofs.

The chemical proofs consist either in separating the arsenic from the matters mixed with it, so that it can be recognized by its physical properties, or in subjecting it to the action of re-agents, which form compounds, distinguished by particular characters. Among the re-agents used for the detection of arsenic, our author thinks that the preference is due to lime-water, ammoniacet of copper, and hydro-sulphuretted water.

Lime-water must be used recently prepared, and hot. Our author found that it was sufficiently delicate to precipitate 1-30th of a grain of arsenic when dissolved in 100 grains of water, or 1-40th in 50 grains.

A saturated solution of ammoniacet of copper, is a much more delicate test, for it strikes an evident green colour with a solution of white oxide of arsenic, which contains but 1-500th of a grain dissolved in 50 grains of water.

"The precaution," he however adds, "which Rose discovered in regard to this re-agent, when added to fluids containing tannin; I found to be perfectly necessary and well founded; for although an infusion of tea did not, in my experiments, prevent the usual reaction of a dilute solution of arsenic, on ammoniaceted copper, as Rose imagines,* I could not obtain any reaction of ammoniaceted copper, upon the decoction of the herbs found in the stomach of a rabbit poisoned by arsenic, although other experiments indicated sufficiently the presence of the arsenic."

Water saturated with sulphuretted hydrogen, formed by the action of diluted muriatic acid on sulphuretted iron, is

* Gehlen observes, in a foot-note, that this difference of observation probably depended on the difference of astringency in the kinds of tea employed; for otherwise he found the phenomenon to be certain.

also a very delicate re-agent. Our author found it capable of detecting, by producing an obvious yellow colour, arsenic in a solution which contained only 1-1000th part of a grain of absolute weight, and in which it bore the proportion to the water only of one to 50,000 or 60,000. The small proportion of muriatic acid, which this hydro-sulphuretted water always contains, does not seem to injure its delicacy, when the gas is prepared with a moderate heat; but it must always be fresh, lest it lose its strength by keeping.

Our author now proceeds to the other method of analysis, by separating the arsenic from the substances with which it is mixed, so as to recognize it by its physical properties. The most common is the converting the arsenic into vapour, by laying it on red coals, or on copper heated to a dull red. In this way our author was sensible of the garlic smell of the tenth of a grain mixed with sugar; but he observes, that it is a very insufficient test, as it depends upon the accuracy of smell of the experimenter, and besides, phosphorus and zinc emit a similar odour. But, by collecting the vapours, so that the arsenic assumes its metallic state, we have an absolutely certain test. In this way Rose asserts, that he was able to detect the one-eighth of a grain of arsenic mixed with animal matters; and our author obtained a very evident sublimate from the stomach and duodenum of a rabbit, poisoned with two grains, and also from the inner coat of the stomach and its contents, of the girl already mentioned, who was poisoned by swallowing a small quantity of black oxide of arsenic. As an additional method of obtaining arsenic in its metallic form, our author proposes, in consequence of Davy's discoveries, the use of the galvanic pile.

This section is concluded by a comparison of the advantages of the methods proposed by Hahnemann and Rose for the detection of arsenic; but as we have not been able to procure an exact detail of these methods, it is not very intelligible. The following extract from a note by Gehlen gives, however, some account of the latter.

“ It was by no means Rose's meaning to confine the proof to the obtaining arsenic by sublimation, but he considered it as absolutely necessary, when no arsenic in substance was found,

because the analysis of the suspected substance, or of the fluid obtained from it by re-agents, without the proper precautions prescribed by him, is, upon the grounds stated by him, very uncertain. An accident, which might render the sublimation abortive, such as the breaking of the vessel, might also happen in the other methods, and destroy the materials; and in this case, with Rose's procedure, we had previously obtained three tests; the precipitation with lime-water; the garlic smell by heating a small quantity of the precipitate upon charcoal, with the blow-pipe, and the analysis of a part of the fluid boiled with nitric acid,* and neutralized on purpose with water saturated with sulphuretted hydrogen. For the ammoniaret of copper, which is almost always inapplicable where there are animal fluids, becomes in this case absolutely so, on account of the formation of the yellow bitter principle, which it also precipitates."

Our readers will have perceived, that this dissertation is of considerable value, and will perhaps sympathize with the regret which we feel, that we have not been able to procure the original. Although too much of it seems to be devoted to a theoretical consideration of the manner in which arsenic acts upon living bodies as a poison, yet it seems to contain much useful information upon two important practical points; the symptoms produced by arsenic, in various classes of animals, and the means of detecting it by analysis.

Every person who has become interested in either of these subjects, must have discovered, with regret, how imperfect our knowledge of them is, and how very difficult it is to obtain or increase it. Systematic writers upon poisons, have jumbled together the symptoms of various doses operating under different circumstances, without discriminating the constant effects, if there be any, from the common or usual effects; nay, they have drawn their descriptions of the effects of poisons, not only from different poisons of the same class, but even from poisons of different classes, and from their effects upon animals of different classes. Poison must still be studied in the way of induction. We must collect all the special facts

* Rose seems to employ nitric acid for destroying the animal matter, with which the arsenic is mixed.

and observations; we must compare and generalize them, and proceed no farther in our general inferences than these facts warrant.

Hahnemann, who has written a book upon arsenic, has adopted a classification of poisoning, by means of it, into three degrees. When death follows the exhibition of the poison within twenty-four hours, it constitutes the first degree; and when later than twenty-four hours, the second degree; and when the case, though attended with dangerous symptoms, does not terminate fatally, it belongs to the third class.

Adopting, then, this division of Hahnemann, as being at least useful, we shall attempt a description of the effects of arsenic upon the human body, from a careful comparison of all the cases which have occurred to us in the course of our reading.

In the slightest case in which the operation of arsenic is recorded as producing poisonous effects, the symptoms are uneasiness at the præcordia, and a sense of heat there. These symptoms are worthy of notice, not so much as a character of poisoning, as, in the practice of medicine, on account of their giving us a very significant warning when we are trying arsenic as a remedy, that we have pushed it to the utmost that any prudent practitioner would venture upon. Where the dose of poison is somewhat greater, but not sufficient to produce death, violent vomiting is commonly the first symptom, although, in some instances, it is preceded by a sense of heat in the tongue and throat; in other cases these sensations are expressly mentioned as not felt in the whole course of the disease. In these cases, when the vomiting is instant, and the poison has been taken on a full stomach, the patient seems to owe his escape to the poison being discharged before it has time to act. The next symptom which claims our attention is the purging, sometimes of blood; but purging occurs less frequently in this slight degree of poisoning than in the more severe cases. In the region of the stomach and bowels, pain is frequently felt, but it is often rather an insupportable uneasiness and oppression than pain properly so called. The stomach is not described as swelling; and in one case, where there was hiccup, eructation, and difficulty of breathing, it is expressly mentioned, that it was not tense or swelled.

A sensation of coldness, especially in the extremities, and cold sweat, seems to have been almost always present, with general paleness, and paleness of the countenance; in some cases languor, faintishness, and a tendency to sleep. In this degree of poisoning, convulsions are not frequently observed, and the thirst and fever seem to arise from irritation in some persons, as they are seldom expressed. In one case only is *ardor urinæ* mentioned.

In the second degree of poisoning from arsenic, where the patient lives above a day or two, the first complaints are heat and thirst, or vomiting, or inexpressible distress; the first is less frequently observed than the other two. In one case of an infant killed by orpiment, the matter vomited is described as viscid and colourless. Purging is not mentioned in any of the cases of this set, but in one a fetid stool was procured by a pessary, and in one gripes are noticed; in two the belly swelled; in one there was great feebleness and lassitude; and in all, convulsions seemed to have taken place, in one case impeding deglutition. In three of the cases the body is mentioned as having been discoloured, or marked with livid spots; in one even blistered, and one was highly fetid. Two only were examined internally. In one the intestines were inflated, and the intestines and stomach red with turgid vessels; in the other the fauces and stomach were yellow, and the heart, spleen, and lungs, dark blue. The cases of this class are too few to afford any accurate inferences; besides, from the length of time, there is greater opportunity for the co-operation of other causes, whether previously existing disease, or the action of remedies.

In the third degree of poisoning by arsenic, where death takes place in a few hours, the symptoms succeed each other rapidly, or begin at the same time; the fainting and general debility almost precede the vomiting; the vomiting occurred in all the cases but two; purging or gripes in most of the cases; the matter passed by stool is in one case described as green, watery, and viscid. In one case there was vertigo, also general pains and loss of speech. Convulsions did not occur often, but there was sometimes hiccup. In a few cases there was much heat and thirst; even in one, in which (a

symptom more frequent than heat) there were complaints of a sensation of intense cold and paralysis of the extremities, with cold sweat. The pulse, in the only case in which it is mentioned, was slow and languid, and death seems to have generally proceeded from exhaustion and rapid sinking of the vital powers. In none of these violent cases is there any mention of delirium, or affection of the mind, except in one in which the poison was applied externally to the head.

The external appearance of the body after death is not uniform. In some cases it was swelled or livid; in others natural. The stomach in almost every instance is inflamed, abraded or even eroded, sometimes distended, and at others corrugated. Next to the stomach and intestines the lungs seem most frequently affected; as in almost every case in which the thorax appears to have been opened, they are described as livid, or having livid spots on their surface. In one case they are inflated, and in another flaccid. The liver is only mentioned in one case as gray, and the heart in another as flaccid. The blood seems to have differed very considerably; at one time being black and coagulated, at another black and fluid, and at a third florid and fluid.

In many of the cases the remains of the poison are actually found in the stomach, generally adhering to the inflamed points, to which it is probably fixed by coagulating the glairy fluid lining the stomach.

Nouvelles Expériences sur les Contre-Poisons de l'Arsenic. Par CASIMIR RENAULT, Médecin, membre correspondant des Sociétés Académique des Sciences, Médicale d'Emulation et d'Instruction. A Paris, an. IX. pp. 119.

[From the Edinburgh Medical and Surgical Journal, for January, 1811.]

THIS work, upon another branch of the same subject, has only fallen lately into our hands. It is also worthy of perusal, and is in a great measure founded on actual experiments made by the author.

He commences with some general considerations on counterpoisons. All gastric poisons may be arranged into two classes, into corrosive and narcotic poisons. The action of the

latter may be interrupted by a strong reaction of the vital forces; that of the former only by a change in their nature, which cannot be effected on the mineral poisons of this class but by chemical re-agents capable of converting them into innocuous substances. Taking arsenic is an example, M. Renault is of opinion, that only those re-agents can be considered as antidotes to it which fulfil the following conditions.

1. Which may be taken in large doses without any danger.
2. Which are soluble in water and the animal fluids.
3. Which act upon the poison, whether in a fluid or in a solid state, at a temperature inferior to that of the human body.
4. Whose action is speedy.
5. Which are capable of combining with the arsenious acid in the midst of the juices and contents of the stomach.
6. And which, in acting upon the poison, deprive it of all its deleterious qualities.

We shall pass over our author's chemical critique on Navier's directions for preparing his celebrated martial hepar, and proceed to his own experiments, which were all made upon dogs, with every precaution to render them as little complicated as possible. He had to overcome the difficulty of forcing the dogs to swallow the fluid, and to retain it after it was swallowed. The first object he accomplished satisfactorily, by keeping the dog's mouth open by a piece of stick placed between the grinders, and injecting the fluids through a tube of elastic gum, introduced into the stomach; but the second was only imperfectly effected, by his never leaving the subject of experiment a moment, and forcibly keeping the muzzle closed by strong compression with the hands, as soon as the precursory signs of vomiting appeared.

His first experiments were made to ascertain the powers of sulphuret of potass, which is generally considered as the most powerful antidote of arsenic. Upon mixing solutions of these substances, they instantly become turbid, and afterwards deposit a yellow precipitate. This mixture, after diffusing the precipitate through it, he injected into the stomach, and, in one instance, he used the precipitate diffused in water; but neither the sulphuret of potass nor that of lime seemed to retard or diminish the deleterious effects of arsenic. Vomiting.

purging, moaning, and prostration of strength, were the almost invariable harbingers of death. On dissection, the stomach was found to be inflamed or livid, generally filled with a glairy fluid like white of egg, often interspersed with flocculi like coagulated albumen, and its surface was sometimes lined with a consistent pseudo-membrane of the same nature.

Water impregnated with sulphuretted hydrogen was next employed, and with some success. A single grain of arsenic is sufficient to kill the strongest dog, and yet, in ten instances, our author gave it in solution, in one to the extent of even ten grains without proving fatal, even although the arsenical solution was given some minutes before the hydrosulphuret. It only remained then to try its effect against arsenic in substance, and here it most unfortunately failed completely; as, in almost every instance of poisoning, the arsenic is used in substance.

M. Renault has examined whether arsenic in its metallic state be a poison. Some experiments of Bayen and Sage seemed to prove the negative, but they were not conclusive. As it is almost impossible to reduce arsenic to powder without its becoming oxidized, our author had recourse to its alloys for deciding the question, and he found that mispickel, given to the extent of two drachms, had scarcely any effect, which accords with the conclusion drawn by Bayen in his work on tin, and proves that the arsenic which may be contained in that metal need give no uneasiness, as it is in its metallic state.

The black oxide of arsenic is, however, a deadly poison, and it has the singular property, that when it acts sufficiently, it produces in the stomach an exudation of blood, and infiltration of the same between the coats of that viscus, without any trace of erosion. A dark gray pulverulent substance, sold publicly in France under the names of *poudre aux mouches*, *mort aux mouches*, *cobalt testacé*, is in fact the black oxide of arsenic, and produces exactly the same effects. Our author therefore contends, and properly, that its sale should be subjected to the same restriction as the white oxide and sulphurets of arsenic.

The native sulphurets, both red and yellow, were given in large doses to dogs without producing any severe effects; the artificial sulphuret was poisonous even in a small dose. M.

Renault thinks that this remarkable difference of effect is owing to the arsenic being oxidized in the latter compound, and in its metallic state in the former.

The salutary effects of vomiting, so often apparent in M. Renault's experiments, have led him into a digression upon the mechanical causes of vomiting, and from thence to some practical inferences concerning the treatment in cases of poisoning. Having proved the inefficacy of all antidotes, M. Renault places his only hopes in exciting speedy and full vomiting; and as a full stomach has been found by experience to diminish and counteract the effects of poison, and is highly favourable to vomiting, he advises the gorging of it with mucilaginous and gelatinous liquors, such as linseed tea, milk, broths, or even with warm water. As vomiting, however, is certainly the chief means of saving a person who is poisoned, and as it does not always take place immediately, our author has proposed a method of washing out and emptying the stomach mechanically, by means of a large tube of elastic gum and a syringe. We shall give the particulars in his own words.

“ The tube should be long enough to have one of its ends, which should have two orifices, inserted into the lowest part of the stomach, and of a diameter large enough to permit the passage of the half-digested substances which may be in it. At its upper end it should have a brass cup adapted to the extremity of a syringe. The tube is to be introduced through the mouth or nostrils, and the syringe fitted to it. We are now to throw gently into the stomach a certain quantity of liquid to dilute, suspend, or dissolve the poison. We then draw back the piston, and suck up a certain quantity of the contents of the stomach. By repeating these two operations several times, this viscus will be well washed, and the poison extracted from it without effort, almost without pain, and in a very short time. Provided the poison have not passed the pylorus, the possibility of extracting it in the method I propose, will be evident to all who have any knowledge of mechanical philosophy. When its efficacy shall have been established by trials on the human body, its use may become very extended. Until experience shall have decided this, I have made some trials on

living animals. I have injected to the extent of eight ounces of water into the stomach of several small dogs, and have been able to pump it entirely out by the procedure I have described. Indeed it could not be otherwise, when we consider with what success similar means are used for emptying the bladder of coagulated blood."

In the after treatment, our author judiciously recommends bland nutritive fluids as preferable to all reputed antidotes, which are uniformly more or less irritating. In the same manner, to remedy the debility occasioned by the poison, we must trust to a proper diet and time.

Our author now proceeds to the very important discussion of the proofs of death by arsenic; and although caution be highly commendable, and indeed indispensable on the part of a professional man called upon to report, still we think that scepticism may be carried too far. It is perfectly true that no single symptom, or, perhaps, no train of symptoms is the uniform and peculiar effect of arsenic; and we may grant that the same uncertainty exists with regard to the appearances which may be discovered on the body after death. But in addition to the cases of this nature already on record, our author has related one on the authority of Prof. Chaussier, in which a man swallowed arsenic in large pieces. The only symptoms produced were slight syncopes on the approach of death. On opening the body, the arsenic was found almost in the same state in which he had swallowed it, and it was not possible to discover the least appearance of erosion or inflammation. Now in this case there was surely no uncertainty; but it will be said, that if no arsenic had been found in the stomach, then there would have been no proof. True; but if no arsenic had been contained in the stomach, then the death would in all probability have been preceded by more violent symptoms, and its effects would have appeared upon the stomach. It was the largeness of the dose which, as it were, extinguished life suddenly, and precluded all reaction. In the same manner, the case here cited upon the authority of M. Dupuytren, to prove that erosion of the stomach may take place where no corrosive poison has been swallowed, is perfectly inconclusive. The body of a woman was opened. There was a hole in the large

extremity of the stomach several centimetres in circumference, through which a small quantity of a reddish fluid had escaped into the abdomen in the vicinity of the spleen. The edges of this hole were thin and even; there was no inflammation except on the parts of the stomach and liver next to the cardiac orifice. But M. Dupuytren knew nothing of the history of this case;—what proofs have we, then, that this woman was not poisoned? It is stated that she had been recently delivered; there were marks of blisters on the legs, and one of the veins of the foot had been opened. Besides, M. Dupuytren could not detect poison by chemical analysis in the contents of the stomach or abdomen. But all these taken together do not amount to the lowest degree of proof that the appearances on the stomach were not produced by corrosive poison. And it may be fairly remarked, that if, in Paris, where bodies are dissected by thousands, no less doubtful proof could be found, that erosions of the stomach sometimes happen independently of poison, it almost affords a presumption that they are only caused by poison. Be that as it may, there generally exist in cases of suspected poisoning, some proofs affirmative or negative of the suspicion, if we have skill to discover them. We admit it to be difficult, but to say that is impossible to discover them is injurious, as it encourages carelessness and indolence, and obstructs the progress of science. We have, however, less objections to our author's conclusion than to his arguments in support of it.

“From all this I conclude, that, except in a very small number of cases, the examination of the body cannot furnish all the data necessary to pronounce judgment in cases of poisoning from arsenic or its compounds; and that, united to a knowledge of the symptoms preceding death, it may afford strong presumptions, but rarely amounting to the degree of certainty necessary to pronounce an affirmative or negative decision.”

M. Renault, lastly, treats of the effects of arsenic applied externally. His experiments were again made upon dogs. When the skin was sound, it excited a pustular eruption without inflammation, but, when the skin was broken, more serious effects followed, both general and local, and sometimes death.

The Morbid Anatomy of the Liver: being an Inquiry into the Anatomical Character, Symptoms, and Treatment, of certain Diseases which impair or destroy the Structure of that Viscus. Order I. Tumors. Part I. On the Tubera circumscripta, and Tubera diffusa. By J. R. FARRE, M.D. Large 4to. pp. 24, with two coloured engravings. 1812.

[From the Edinburgh Medical and Surgical Journal, for January, 1813.]

WE have great pleasure in announcing to our readers the first fasciculus of a work, which is obviously the result of much personal observation and laborious research, in a very important department of morbid anatomy; and which, from the execution of the present specimen, bids fair to throw considerable light on a class of diseases, respecting which we are apt to think and to speak with some want of precision. With the indefinite views, that are commonly attached to the terms *scirrhus liver*, *liver-disease*, &c. it is impossible that the practitioner can exercise much discrimination in the choice of his curative measures: and, in fact, it but too commonly happens, notwithstanding the varieties of morbid condition which those terms comprehend, that one system of practice is pursued, as if the organ in question were subject but to one modification of organic disorder. To correct these indistinct notions upon the subject, nothing seems to be better calculated than an arrangement of the various changes to which the liver has been found liable, more especially when accompanied by accurate delineations of the morbid conditions, and by histories of the symptoms, which had occurred during the progress of these changes. Such a combination, uniting the advantages of the methods adopted by Morgagni and Baillie, has never before been presented to the public; and from the excellence of the delineations exhibited in this work, nothing short of the actual exhibition of the diseased viscus itself is left unsupplied. Of the latter, the reader can only estimate the perfection by inspecting the work itself; but of the objects of the publication, and of the contents of this fasciculus, we shall endeavour to present him with a faithful account.

Dr. Farre informs us, in his introduction, that his treatise will be limited at present to the investigation of *tumors*, *scrofulous* affections, and the consequences of *inflammation* of the liver; which, we presume, will constitute the three Orders of his classification. These varieties of disease, he observes, impair the stricture of the liver in different modes:

“For tumors are chiefly injurious to it by their unlimited powers of growth or multiplication; but inflammation simply disorganizes the liver by obliterating its structure. Hence the ultimate state of the former, is the utmost degree of enlargement which is compatible with life; of the latter, rather a reduction of bulk, but an increase of solidity. Scrofula only proves destructive to the structure of organs when its tubercles inflame: the disorganizing effect of this disease on the liver is therefore analogous to that of inflammation.

By the word Tumor, which characterizes the first Order to which our attention is at present directed, the author does not mean a mere intumescence or enlargement of the viscus; but, following the example of Mr. Abernethy, he designates, as tumors, those swellings which arise from a new growth, differing from the original composition of the part affected. Whence he defines *Tumors* in these words: “Swellings, either circumscribed or diffused, generally differing in the structure from the natural textures of the affected organs, and increasing in bulk by an inherent growth.”

The first genus of Tumors, which occupies this fasciculus, he has denominated *Tubera*, and defined, “Tumors of a cellular structure and fungous nature, producing, in general, remarkable elevations on the surfaces of the affected parts.” Thus it appears, as well as from the appropriation of the term Tubercle, in the passage above quoted, to the scrofulous affections of the liver, that our author does not consider the latter as a diminutive of Tuber, but as totally distinct in its signification, and not implying the *fungous* and cellular structure, which belongs to the Tuber. The varieties of these fungous *tubera*, Dr. Farre arranges under two heads or species, with the epithets *circumscripta* and *diffusa*, the characteristics of which are detailed with much perspicuity.

1. The *Tubera circumscripta* are so denominated, because they are determinate in their figure: they are likewise distinguishable from the other species in being found only in the liver, seldom or never originating, the author seems to believe, in any other structure of the body. This tuber is the same with the "large, white tubercle of the liver," described by Dr. Baillie, in his "Morbid Anatomy," chapter IX, and figured in his 5th fasciculus of engravings, Plate III. fig. 2 and 3.—Dr. Farre observes, in a note, that it is with extreme reluctance he ventures to propose another name for this disease; but, he adds, "the epithets '*large, white,*' are not characteristic, being common to both species, and belonging indeed in a more remarkable degree to species II. It seemed to him also objectionable to apply the term, *Tubercles*, indifferently to these large tumors, to certain irregularities of surface produced by chronic inflammation, and to scrofula." Whatever inconvenience the multiplication of synonymes may occasion, the greater approximation to accuracy will certainly more than counterbalance it.

Dr. Farre proceeds to describe the characteristics of the *tubera circumscripta*, which cannot be stated to the reader so satisfactorily as in his own words.

"CHARACTER. Their colour inclines to a yellowish white; they elevate the peritoneal tunic of the liver, and their projecting surfaces, slightly variegated with red vessels, deviate from a regular swell, by a peculiar indentation at or near their centres, which are perfectly white and opake. They vary much in size, which depends on the duration of each tuber: for, at its first appearance, it is very minute, but during its growth it assumes the character above described, and at its maturity exceeds an inch in its diameter. They adhere intimately to the liver, and their figure is well defined. In the interstices of the *Tubera*, the liver is paler and more flabby, its cohesion is weaker than natural, and slight effusions of blood are sometimes found. They commonly remain distinct at the surface of the liver, but internally they ultimately coalesce, and form immense morbid masses which pervade its substance. The patient often lives until the mass occupies the greatest part of the abdomen, and the natural structure of the liver is

nearly supplanted. They possess so close a cellular structure, that the section of them, at first view, appears solid and inorganic; but on the edge of the knife, by which they have been dissevered, an opaque white fluid, of the consistence of cream, is left, and a fresh portion of this fluid is gathered on it at each time that it is repassed over the surface of the section. Their cellular structure becomes more apparent after long maceration." p. 6.

The engraving, which represents the state of disease above described, is one of the happiest specimens of the pencil and the graver that we have ever seen executed on an anatomical subject: it almost supersedes the necessity of actual dissection, so true and faithful is the picture. The preservation of the colour of the different parts is a most important advantage over the best engravings in black. So far as a knowledge of the actual state of disease in this condition of the liver can be communicated; so far as the results of anatomical research can enlighten us, this work most fully accomplishes its end, and is entitled to unequivocal commendation. But as we some time ago took occasion to express our dissent from the popular doctrine, that a minute knowledge of the anatomy of the human body, in health, is the best or almost sole foundation of the science of pathology and of the practice of physic;* so we cannot but remark, with regret, at present, how little even this most lucid display of the results of morbid anatomy contributes to extend the practical powers of our art. The author, with a candour equal to his ample knowledge of the subject, gives the following account of the diagnostic appearances, by which this state of the liver is indicated during life.

"SYMPTOMS. The patient suffers pain in the region of the liver, languor, loss of appetite, and cough; *but until the liver, by the growth of the Tubera, descends below the hypochondria, a distinct judgment of the case cannot be formed.* Then the functions of the alimentary canal are more impaired, the body wastes, and the enlargement of the liver, its hardness and remarkable irregularity of surface, may be distinguished through the parieties of the abdomen. In the advanced stage, the pa-

* See the Inquirer, Edin. Med. and Surg. Journal, for Jan. 1809. Vol. V.

tient is distressed by its enormous bulk, the respiration is oppressed, the bowels are prone to diarrhœa. Neither jaundice nor serous effusion into the peritoneum are symptomatic of this disease: they may be conjoined, but it is an accidental circumstance, rather than a necessary consequence." p. 7.

The result, then, in this instance, as in many other cases of chronic derangement of structure in the viscera, to which the fullest investigation conducts us, is, that before the symptoms, which are sufficient to point out the exact seat and nature of the disease, unequivocally manifest themselves, the structure of the organ is irretrievably ruined:—before we learn to what point we should direct our remedies, all remedies are become useless. We remember to have heard a remark, made by a person unacquainted with medicine, relative to the character of an eminent cultivator of morbid anatomy;—that "he was possessed of a singular talent in *distinguishing* diseases, but that he was incapable of *curing* them, when detected." The remark should have been applied to the science, and not to the professor. For, in truth, to what unessential ends does not the sum of the knowledge of the morbid anatomist frequently conduce! to the naming of the viscus, which is the seat of an incurable malady! to the clearing up of a doubt, whether a tumor, which no medicine can reach, be situated in the spleen, the mesentery, or the omentum! to determine the presence of pressure or morbid growth in the sensorium; which, if exhibited to the eye, like honey-comb in a hive of glass, would defy the exertions of medicine and surgery!

But, it may be said, discrimination of diseases by their symptoms is the first characteristic of an able physician, that every improvement of this art is an approximation to a better practice, and that it is impossible to set limits to the advancement of human skill, while pursuing knowledge upon the basis of observation. We admit the truth of the remark, and are far from intending to decry the pursuits of the morbid anatomist, by the digression which we have just made. We wish only to affix a right estimate to the degree of knowledge which is thus to be obtained, and not to mistake the information that is curious, for that which is useful: we shall see, before we conclude, that our author modestly limits the practical benefits to

be derived from the facts which he has here promulgated, to the prevention of injurious measures.

It is a singular fact, which we also have witnessed, that, when the mass of tubercled liver nearly fills the whole abdomen, so that the hardened and irregular edge of it is felt extending from the spine of the ilium across to the umbilicus, or even lower, neither ascites nor jaundice shall exist. In consequence, probably, of the lax and flabby texture of the interstitial parts among the tubera above stated, the circulation of the vena portæ goes on with little interruption. And it is scarcely less surprising, to what a great extent this morbid growth has often attained, before it is detected, or any considerable inconvenience is produced by it.

Dr. Farre has related two cases, in which this fatal disease of the liver attacked men subject to gouty affections, and frequent indispositions, which were ascribed to cold or indigestion, both of whom had been intemperate in early life. The second patient, whose liver is represented in the plate, had suffered irregular paroxysms of pain in the epigastrium, but when he consulted a physician at the end of March, 1811, he complained only of "cough and uneasy sensations in the epigastric, and right hypochondriac regions." When the naked abdomen was examined, the liver was felt projecting into the umbilical region, filling the whole space of the abdomen, which is between the umbilicus and the margin of the thorax. This part of the belly was tumid and hard, presenting a surface irregular from tubera, which could be distinctly felt under the integuments. Yet the patient positively affirmed, that he had noticed the enlargement only six weeks before this period: and his cough and dyspnoea were not greater in degree than it was fair to impute to the great bulk of the liver. His pulse was natural, but his appetite defective, and the bowels rather torpid. "There was no obstruction to the circulation of blood through the liver, for there was no effusion into the peritoneum, nor to the flow of the bile, for the skin and urine were not in the slightest degree jaundiced." The principal attempt made by medicine was to regulate the bowels by rhubarb, and to allay pain or procure sleep by opium. The patient died in the

beginning of July; and the body was examined on the following day.

“The liver occupied the hypochondriac, epigastric, and umbilical regions: a line drawn across the anterior superior spinous processes of the ilia would have defined its extent; so that, a few convolutions of the small intestines in the hypogastric region excepted, the diseased liver alone appeared, after the section of the abdominal parietes had been completed. The liver was removed. Its surfaces were covered with tubera: more than fifty were counted on its concave surface, and on its convex surface there was a still greater number. All these tumors had the same character, (see Plate I.) viz. a circular margin, elevated, firm, and white, with a depressed and very white centre, resembling a cicatrix. The only deviation from this character was occasioned by a coalescing of two tubera, by which their figure was changed to an irregular oval. Besides these mature tubera, a countless number of them in their incipient state appeared in all directions, &c.” (p. 13.)

Dr. Farre has only met with one variety of this species of hepatic tuber, which differed from the preceding chiefly in the smaller size and firmer consistence of the tumors. Although he has seen two cases of this disease, in which there was at the same time a scrofulous condition of the mesenteric glands, yet he is inclined to dissent from the respected authority of Dr. Baillie, who deems the tubera *circumscripta* of a scrofulous nature. The strumous tubercles of the liver Dr. Farre considers as differing essentially, both in their character and termination, from the fungous tubera; and this difference, he contends, is farther evinced by the consideration of the very distinct texture of the tubera *diffusa*, with which the *T. circumscripta* are obviously allied.

2. The *Tubera diffusa*, and the very equivocal means of diagnosis which present themselves to the view of the practitioner, are briefly described by our author in the following terms.

“CHARACTER. These tumors not only pervade the substance of the liver in a distinct or in a confluent form, but also appear at its surface, elevating more or less its peritoneal

tunic. They rise from the surface of the liver with a more gradual and uniform swell than the tubera circumscripta, and are, in different subjects, of various figures, sizes, colours, and consistence; often pulpy. No texture seems to escape the ravages of this fungus. It appears indifferently in all the viscera, in the cellular membrane, and even in the bones.

“SYMPTOMS. These vary in proportion to the varied seats of the disease: the diagnosis, therefore, must depend on one of the circumstances from which its name is derived, viz. its dispersion through many textures of the body. But when this disease affects the liver in particular, then the symptoms will not materially vary from those which accompany the Tubera circumscripta.” p. 15.

Of the tubera diffusa there are many varieties, (which will be the subject of discussion in the next fasciculus) agreeing with the T. circumscripta in their cellular structure, and with each other in their co-existence in the liver and other organs of the body. From this circumstance, that many organs are at the same time oppressed by their growth, they are in general more speedily fatal than the T. circumscripta: but instances of the disease are not unfrequent, in which the other viscera are infested with these tubera, while the liver is altogether free from them. With this variety in the seat of the tubera in the different organs, the symptoms must necessarily vary extremely: and in fact, no two diseases could differ more widely in their phenomena than the two cases of the T. diffusa related by Dr. Farre.

In the former of these cases, the first symptoms were a cough and diarrhœa, which were followed, after several weeks, by an enlarged belly, as the liver descended below the umbilicus, and at length by symptoms of hydrothorax, of which he died six months after the distention of the abdomen commenced. On dissection, some serous effusion was observed in the sacs of the peritoneum, of the left pleura, and of the pericardium: the liver was found enormously large and tuberos, weighing upwards of fifteen pounds; and at the same time, from the mucous coat of the stomach, near the cardia, there grew a cluster of tubera, that projected into its cavity, which

were not sufficiently advanced to interrupt the course of the alimentary matters, and had not therefore been suspected. The remarkable increase of bulk in the liver was occasioned by the growth of Tubera, which differed from the *T. circumscripta* in the following circumstances.

“ They were less numerous; for, on the concave surface of the liver their number did not exceed twelve: they were as minute at their beginning, but at their maturity considerably larger, their diameters being rather more than three inches: at no period of their growth were they externally indented, but, on the contrary, they rose from the liver with a gentle and uniform swell, each being either round or oval; their external surfaces had a motley appearance, their white colour mingling with the brown colour of the liver; but a section (Fig. 1. Plate II.) displayed the appearance of the Tubera distinct from the substance of the liver, on which they seemed continually to encroach, and to approximate to each other by waving margins: their texture was coarser, but it yielded a similar whitish fluid.”
page 17.

In the second case, the principal symptoms were seated in the head: there was excruciating headache, increased to torture by motion, and aggravated in regular daily exacerbations, accompanied with some cough, nausea, vomiting, frequent pulse, and subsequently with slight delirium and convulsions. The disease terminated fatally in about two months; and, on dissection, the Tubera in question were found in the following situations: namely, one, somewhat larger than a pigeon's egg, in the medulla of the hemisphere of the cerebrum; another, of smaller dimensions, in the posterior part of the same hemisphere; and vestiges of smaller ones in the cerebellum and corpora striata;—one of large size occupied the seat of a lymphatic gland, under the left angle of the inferior maxillary bone; and round one of the right bronchial glands, as a nucleus, an immensely large tuber had formed;—in the liver, there was a single tuber, which in structure resembled that in the lung;—and to the adipose tunic of the left kidney, a tuber, of eight inches in circumference, was attached. How vain the administration of mercurials, of cinchona, of rhubarb, of antimony, and

even opium, with the application of blisters, proved, even for the alleviation of present distress, it is unnecessary to state: but this consideration leads us to the inferences, with which Dr. Farre concludes this fasciculus.

“The investigation of Disease by Anatomy,” he remarks, “not only improves the diagnostic part of medicine, by connecting, as far as it can be done, the sign with the morbid change; but it also improves the therapeutic, by gradually *separating curable from incurable* disease, or by indicating the stage at which the former is converted into the latter. It is, therefore, one important use of Morbid Anatomy, to point out the boundaries beyond which it is not only unavailing, but *injurious for art to interfere*, except to diminish suffering. I venture to oppose this truth to the reverse practice, apparently founded on a maxim, that if an organ be subject to many obscure diseases, of which one or more can be cured, but the others are incurable, then all should be treated like the curable disease.” p. 21.

His allusion is obvious: and he goes on to explain, that, as far as his observation has gone, the operation of *mercury* is not beneficial to patients afflicted with the diseases here described. He justly observes, that few medical men now think of trying such a course of medicine for the removal of tumors, (in the restricted sense,) when they appear externally: and still less effectual can it prove in the cure of either the *tubera circumscripta* or *diffusa*: “for by the time that the most careful examiner can distinguish them, the progress of the disease has been already so considerable, that *the mercurial action tends only to exhaust powers, which art will subsequently in vain attempt to restore*.” With the view of leaving no instruction to be casually inferred by the reader, Dr. Farre candidly admits, that, in three of the four cases, *too much was done* by ineffectual efforts to cure; while, in the remaining instance, a mere palliative plan effected all that medicine was capable of,—“it clearly diminished, but did not inflict any, suffering.”

Although we cannot but lament, that the benefit produced by the cultivation of morbid anatomy is, in these cases, but negative; yet, as it effects all that human research can accom-

plish, we most fully accord with the concluding sentiment of our author, that "this view of the subject is not derogatory: for the perfection of medicine consists, not in vain attempts to do more than nature permits, but in promptly and effectually applying its healing powers to those diseases which are curable, and *soothing those which are incurable.*"

We shall look anxiously for the succeeding fasciculi of this elegant work, as well as for the smaller publication on a similar subject, announced by Dr. Farre, in conjunction with Mr. Travers, and intended to appear periodically. The simplicity, and candour of the opinions advanced in the treatise before us, as well as the according accuracy of the descriptions and graphic delineations which it contains, lead us to anticipate with confidence, that his labours will ultimately put us in possession of a more complete knowledge of the varieties of morbid change, which the viscera undergo, than is to be obtained from the works of his predecessors.

FOR THE ECLECTIC REPERTORY.

CASE

Of the Effects of Blistering in preventing Mortification.

By SAMUEL POWEL GRIFFITTS, M.D.

The following Case, exhibiting some variation in the treatment of a disease, which frequently proves mortal, induces me to offer it for publication.

10th mo. 5th, 1804. I was called to visit C—— F——, aged fifty-three years, who, in general, enjoyed good health, and had, for some years past, retired from an active share in business. About twelve months ago he strained his left ankle, and about six months ago, received a severe shock by striking the same foot against a board, with such violence, as to break the shoe-buckle; and a few days since, strained the same foot. He wore very small uneasy shoes for the last month; of these particulars he gave me no information at the time, but complained of pain in the left foot, and had had dyspeptic symptoms for about six weeks. Five weeks ago he had a numbness in his left shoulder, and four weeks ago a similar affection of the left hand. Two nights since, he was seized with a coldness in his foot and leg, which now extends nearly to the knee. From the 11th to the 19th he slept in his easy chair—the dependent posture of the foot being the only tolerable one. His tongue was dry—the foot and leg swelled, cold and nearly colourless. A small pale red spot, which was often painful, appeared about the center of the upper part of the foot.

19th and 20th. The swelling subsided, and he could lie in bed with the foot in a recumbent posture.

21st. In the morning, a sphacelated spot appeared under the two smallest toes. Until this time he had taken no medicine but the tincture of guaiacum, and had been directed to live generously. The bark, in powder, was now substituted for the guaiacum, and used very freely, as much as half a pound in the twenty-four hours. The beer or ley poultice was applied; and the sphacelus having spread by afternoon, the charcoal poultice was substituted in its place.

On the 22d, Dr. Wistar was called in, and the fermenting poultice, with charcoal, was used. The bark was continued, with wine and porter, freely.

23d. Dr. Physick was called in. The same remedies were continued, with the addition of pills of volatile alkali until the 27th: the sphacelus having at this time made considerable progress, half way up the leg; when Dr. Physick proposed a large blister plaster just below the knee, where no disease, as yet, was to be perceived. The skin lower down appeared of a dusky red colour, commonly termed erysipelatous. We were much gratified next day, by observing that the blistered part looked healthy; and, on the 29th, applied another blister plaster lower down, near the sphacelated part, which produced a good blister without any unpleasant consequences. The carrot poultice was applied to the dead part, until the 2d day of the next month, to remove the smell. The blistered part was dressed with an ointment composed of ungt. basilic. and spt. terebinth. This night he was very restless: nourishment was given freely; the bark was omitted, on account of the stomach's being nauseated, for a day or two, when it was resumed in the form of decoction and tincture. The bowels were kept open by glysters, and a moderate dose of tinct. theb. given every night. The progress of the mortification appeared to be stopped, and several incisions were made in the foot.

11th mo. 1st. The line of separation was now very distinctly marked; the pulse and spirits were good; the sphacelated part was washed with a mixture of equal parts of nitrous acid and river water, which evidently removed the fætor and swelling.

3d. Continued doing well; omitted the nitrous wash as unnecessary. A diarrhœa came on, for which chalk julep, sago, and claret were prescribed.

4th. The diarrhœa had ceased.

5th. Dressed the blistered parts with ungt. album.

6th. The healthy parts, about the line of separation, swelled.

7th. The last night was the third bad one he had passed, though well in the day-time. A semicircular incision was made through the integuments, just below the healthy part, the blistered part not being all in an healthy state, but some of it inflamed, to which a bread and milk poultice was applied.

8th. A bad night—a dark part in the skin, near the line of separation on the upper part, which was dressed with the turpentine ointment. The under part of the leg suppurated kindly.

9th. His tongue was now moist, which had hitherto been dry. He took the camphor mixture to-night.

10th. The tendency to delirium at night, which has appeared for some time, was absent last night, though he got but little sleep. His appetite and general health rather better; the leg much improved. He took senna tea to day, as he has frequently done, when costive. Took the camphor mixture at night.

11th. Took forty-five grains of camphor in the mixture to-night, and rested well. Appears much better to-day, in every respect.

12th, 13th and 14th. Doing well, except an hectic blush on his cheek, at 11 A. M. and at night. Free discharge of pus. Peruvian bark, in wine, and elixir of vitriol were now used, and continued to the 25th instant, with laudanum at night. The separation goes on rapidly. The dressings were now changed for a bread and milk poultice, with some flaxseed meal.

27th. The sore not looking healthy, the turpentine ointment, with the poultice of bread and milk, were applied until the 29th; when the healthy appearance of it returned.

The next month nothing particular occurred; the parts were dressed with ungt. alb.—The separation proceeded favourably; and his health was much improved.

1805. 1st mo. 3d. Discontinued the laudanum, which he had used till this time, seventy drops every night. He slept as much, though not so sound, as when he took it.

11th. Last evening, a considerable portion of the sloughing matter appeared to separate, suddenly, from the under part of the leg. He was seized with a trembling and nausea, and this day had a loss of appetite.

12th. He was better; part of the sloughing matter was removed—the separation progressed, and on the 21st, the fibula was bare.

2d mo. 21st. Continues mending. This day, the tendo Achillis sloughed off.

3d mo. 1st. The fibula appeared to exfoliate at the uppermost part of the sore. For a few days past, he has felt more

uneasiness than usual in that spot—next day the lower part of the fibula was removed, by sawing it off.

5th mo. 6th. The sore went on healing to this day, when the ankle and foot were removed, by sawing through the tibia, about an inch below the separated part.

The sore healed slowly until the 11th mo. when the bone, which had been left, was removed; and the sore was not entirely healed until the following summer. He lived several years afterwards, in apparent good health.

I have been particular in this interesting case, as I think the practice is rather new, and that it will lead to some considerable improvements. Although the bark was given very freely, yet I cannot but attribute the check given to the mortification, to the use of the blistering plasters; and have since applied them, with manifest advantage, in cases that appeared analogous to the present. I am induced to believe that the original disease was inflammation of the fibula, and that this bone was affected in the same manner as the bones are in paronychia. I have therefore, since that time, blistered very freely in paronychia, both where the inflammation of the skin was active, as well as in that passive state of it called erysipelatous, and with the most desirable success. I do not hesitate, after bleeding and purging, when such evacuations are called for, to trust entirely to blistering, in these cases, whether the affection is confined to a finger only, or is extended to the whole hand.

Philad. 6th mo. 24, 1813.

FOR THE ECLECTIC REPERTORY.

The Editors are indebted to an obliging and valuable correspondent, for the following interesting account of the life and character of one of our most distinguished medical brethren.

DIED, on the 19th of April, 1813, in the sixty-eighth year of his age, BENJAMIN RUSH, M. D.

Dr. Rush was born on the 24th of December, 1745, old stile, on a small estate belonging to his father on Poquestion creek, twelve miles distant from Philadelphia. At an early age he was sent to the school of the Rev. Dr. Samuel Finley, in Nottingham township, Cecil county, Maryland. In the spring of 1759 he entered the college of New Jersey, and in the autumn of 1760 he received the degree of bachelor of arts. At college his character for talent was very respectable, and he was distinguished for a rapid progress in his studies. In the exercise of public speaking he evinced great eloquence, and his friends expressed a strong desire that he should study law; he consented to their wishes; but on a visit to his old master Dr. Finley, whom he venerated as a saint, and loved as a parent, he was dissuaded from the scheme; and it is to Dr. Finley's discernment that the medical profession is in this respect indebted for the advantages it has derived from the subsequent labours of Dr. Rush. Dr. Finley's advice was founded upon an intimate acquaintance with the head and heart of his pupil, and he considered the qualities of both admirably adapted to the practice of that profession which he afterwards adorned.

Renouncing the bar, he commenced his medical studies under the direction of Dr. John Redman, of Philadelphia, with whom he continued six years. Of his diligence during this period, some estimate may be formed from the fact, that in the whole of that time, he absented himself from his business *only two days*.

In the summer of 1766 he sailed for Europe. He proceeded first to Edinburgh, where he remained until the spring of 1768; when he received his medical degree from the hands of Drs. Cullen, Black, Gregory, and the historian Dr. Robertson. His thesis was written "*De coctione ciborum in ventriculo.*"

The winter of 1768-9, he passed in London; and in the spring of 1769 he went to Paris, and returned to America in the summer of the same year.

Whilst abroad he was busily employed in the acquisition of useful information on every branch of science connected with medicine; and soon after his return, Dr. Rush was unanimously appointed Professor of Chemistry in the college of Philadelphia, viz. on the 1st of August, 1769.

Dr. Rush very quickly became engaged in the practice of his profession; his leisure was devoted to reading and writing on subjects of science, morals, and politics. About this time appeared his *Essays on Negro Slavery*, and subsequently, those on *Capital Punishments*;* both of which he reprobated as inconsistent with christianity and sound morality. To the pious and humane disciples of Fox and Penn, these essays were particularly grateful, and, by serious christians of every sect, they were approved and admired. The influence of these writings has been felt and acknowledged, at least in the state of Pennsylvania, where they have certainly been instrumental in effecting the most salutary modifications of the penal code, and of the laws respecting negro slavery.

Among the earliest advocates of the American revolution, Dr. Rush drew his patriotic pen, and laboured sedulously to promote the best interests of America. He served his country in other ways; he sat in Congress and signed the Declaration of Independence in 1776, and in 1777 he was appointed physician general to the American army, a post which he resigned in 1778, and resumed the private practice of his profession; the emoluments of which he had relinquished, in order to

* His "Address to the inhabitants of the British colonies on Slave-keeping," was published in 1771, to aid a petition to the legislature on that subject. The date of the latter is not recollected.

discharge those public duties to which the state of affairs imperiously called him, and to which his talents were so well adapted.

He was chosen, in the year 1787, a member of the state convention for the adoption of the federal constitution.

In the year 1789 he was elected successor to Dr. Morgan, in the chair of "the Theory and Practice of Physic" in the College of Philadelphia.

In 1791 the College of Philadelphia and the University were united, and Dr. Rush was appointed to teach "the Institutes of Medicine and Clinical Practice." In 1805, Dr. Rush was appointed "Professor of the Institutes and Practice of Physic and of Clinical Medicine," though he had for several years previously taught these branches in consequence of the resignation of Dr. Kuhn: this chair he continued to hold during the remainder of his life.

He officiated for many years as treasurer to the Mint of the United States.

Dr. Rush was thirty years a physician to the Pennsylvania Hospital; during which time he was never absent from the house ten minutes after the appointed hour of prescribing for his patients, unless confined at home by sickness.

His services at the City Hospital, in the yellow fever of 1798, will long be remembered by the citizens of Philadelphia. They were gratuitous; but the Board of Health, in testimony of their importance, presented to him a very elegant piece of plate, with an appropriate inscription.

In the preceding calamity of 1793, he was indefatigable in his professional duties, and laboured very actively to defend his new opinions and modes of practice.

The scientific character which Dr. Rush had acquired, ranked him among the members of almost every medical and literary institution in the United States. He was also complimented with numerous honorary distinctions from foreign nations.

In 1767 he was presented with the freedom of the city of Edinburgh; and in the same year he was elected a member of the Revolution Club in that city.

In the year 1772, he was chosen a corresponding member of the London society for the encouragement of arts and manufactures.

In 1786 he was elected a member of the society of arts and sciences at Milan.

In 1791 he was chosen a member of the German society of "Naturæ Curiosorum."

In 1805 he was addressed by the Prussian government for answers to certain queries respecting the yellow fever; and received, as a compliment for his answers, a coronation medal from the king.

In 1806 he received the thanks of the king of Spain for his answers to queries on the same subject.

In 1807 he received a gold medal from the queen of Etruria. In the same year he was chosen a member of the national institute, class of fine arts, at Paris; and in 1808, a member of the society of the school of medicine at Paris.

In 1811 the emperor of Russia, in compliment to his medical character, presented to him a valuable diamond ring.

The writings of Dr. Rush are very generally known throughout the United States. Those which are preserved in separate volumes are his three essays, called "Sermons to Gentlemen on Temperance and Exercise," published in 1771.

His Medical Inquiries and Observations, the third edition of which was published in 1809, in four volumes.

A volume of Introductory Lectures.

A volume of Essays, moral, literary and philosophical.

A volume, in 1812, on the Diseases of the Mind. Besides which, he has published numerous and valuable essays in the different periodical publications of this country.

During the latter years of his life, his reading was confined exclusively to medical and religious books. He had a great facility in acquiring languages, and understood the Latin, Greek, French, Italian and Spanish. In his native tongue, his writings are always perspicuous, and his style often elegant.

Dr. Rush was for many years engaged very extensively in the practice of his profession, in the city and suburbs of Phila-

delphia; and although he never enjoyed robust health, yet the exposure of his person, in the discharge of professional duties, seldom occasioned him severe indisposition. During the last year or two of his life, a cough which he familiarly called his "tussis senilis" increased very considerably; and having suffered in early life from some pulmonary symptoms, which were thought to wear a consumptive aspect, he never believed he should live to be old.

After visiting his patients as usual, on Wednesday the 14th of April, he was attacked in the evening with a violent chill, which was relieved by some brandy and water. In the night he awoke with a very severe pain in the side, attended with great difficulty of breathing. He sent for a bleeder and ordered him to take eight or ten ounces of blood from his arm. After loosing blood he was relieved and slept. A medical friend was requested to visit him the next morning, and finding him weak and exhausted he administered wine whey, which was evidently very beneficial. His pulse, however, became gradually weaker, and his symptoms soon assumed the prevailing typhus type. Stimulating remedies were administered to as great an extent as the stomach would bear, and external irritation was kept up, but without effect; at about 5 o'clock P. M. on Monday, 19th April, he expired. He was perfectly rational, and expected, with the greatest composure, his approaching dissolution. Some of his last moments were spent in fervent prayer.

With respect to the character of Dr. Rush as a physician and a philosopher, the medical world will not form their opinion from a memorial like the present,—but there are peculiarities of mind in every individual, which are most evident to his intimate associates. The writer of the present article having enjoyed, during some of Dr. Rush's latter years, the honour and advantages of his friendship, thinks himself authorized to speak of him in the following terms.

Dr. Rush, of all men I have ever known, was *first* in conversation. His mind was admirably constructed for this exercise. It had, originally, possessed faculties of no ordinary acuteness;

and these were sharpened by every useful and ornamental study. His memory was a magazine stored with the choicest literary treasures; and so well arranged, that whatever the occasion needed, appeared to present itself first. His judgment was sound, and consequently his remarks always pertinent; but the talent in which he particularly excelled, was *illustration*. No man ever surpassed him in placing in its strongest and most favourable light, any position which it was his design to establish. An apt anecdote, a striking analogy, or even a remote allusion had, in his language, the force of a serious and cogent argument. Every occurrence of his life,—every conversation in which he engaged,—every book, every letter, every newspaper he read,—seemed to furnish him with some new thought of useful import. He never failed to find “sermons in stones, and good in every thing.”

His lectures, delivered in public, could not fail, from the circumstances just related, to be instructive, amusing and popular. I do not apply these epithets to such a course of lectures with a view to fix their character, but to notice, briefly, some incidental points, which gave a lustre and brilliancy to important and novel truths. The medical world have not yet learned how to appreciate the professional talents of Dr. Rush; but the day is not remote in futurity, which shall do ample justice to his original mind. At that day, his enemies will have no object in opposing, nor his partisan friends any advantage in supporting his doctrines. At that day, the medical profession will unanimously admit, that Rush is a name worthy to be inscribed on their records, in characters of imperishable splendour!—It is not saying too much, and it is saying what, as an individual, I honestly believe, that to Dr. Rush, more than to any other physician, the medical profession owe their knowledge of the proper method of treating the diseases of America. If the ardour of his mind directed him enthusiastically to extend a principle too far, it must be confessed that this was excusable—was even useful; it evinced an honest confidence that he was right, and that nothing should deter him from pursuing truth, even to the very confines of paradox. I may add, nothing ever did deter him. In spite of all opposition, he maintained his ground; and died, firmly impressed with the truth and importance of the

doctrines he had advanced and taught; and he triumphed in anticipation of their future success. He remembered the fate of Boerhaave: but, though he supposed his personal merits would be forgotten, *his principles* and his practice he expected to outlive him; and long—very long will these be remembered.

The temper of Dr. Rush was ardent and his friendships were firm; he never forgot a benefit, and if he remembered injuries, it was because he had many and harsh ones inflicted upon him. He was ready to believe every thing in a person's favour; and generally over-rated the excellencies, not only of his friends, but of his general associates. In speaking of them he was often supposed to flatter, when he actually expressed the present feelings of his mind. In a sick room he was a comforter, a friend, a father to his patients: they loved, they almost adored him!

His confidence in the powers of medicine was great, and hence he prognosticated the most favourable event in every case of disease; he was called sanguine, but he was sincere in the expression of his opinion, and often relieved the present sorrows of his patient, by his pleasing anticipations of better things.

Perhaps no calamity to which human nature is subjected, can, in all respects, be considered commensurate with a privation of reason. If mind be actually the better part of man, its diseases must be more important, in the same ratio, as its nature is more excellent, than that of the mere anatomical structure formed for its temporary accommodation. This was an idea, which did not fail to excite, in the enterprising genius of Dr. Rush, efforts proportionate to the magnitude of his task, in the development of the nature of human intellect in health and disease. The results of these investigations form, at this time, important additions to the knowledge and usefulness of medical men.

The cell of the maniac they no longer approach with desponding gloom. An asylum, which does honour to the state of Pennsylvania, to the whole western hemisphere, and to the age in which humanity established its foundation, affords, in its annals, numerous trophies to the skilful zeal of this physician of the mind. Wretches, depressed below the level of the brute, have been raised by his exertions, under Providence, to the

grade of human beings, and to the full enjoyment of their pristine faculties. Hundreds, perhaps thousands, will in future swell the list, who will owe to the labours of Rush these exalted blessings. In this view of such a subject it is perhaps, if reverently uttered, not profane to exclaim with Cicero "*Hominibus ad deos nulla re propius accedunt quam salutem hominibus dando.*"

In the character of Dr. Rush religion and knowledge were combined in a degree seldom equalled: science and humanity were adorned by every accomplishment which can add grace to dignity. He was a patriot—a philosopher—a statesman—a physician;—he was great in every of these capacities—but his highest style was CHRISTIAN!—

Biographical Memoirs of the late ROBERT WILLAN, M. D. F. R. S. and S. A. Author of the Work on Cutaneous Diseases, &c. &c.

[From the London Monthly Magazine, for January, 1813.

ROBERT WILLAN was born on the twelfth of November, 1757, at the Hill, near Sedbergh, in Yorkshire, where his father resided, in the enjoyment of extensive medical reputation and practice*. He was educated in the principles of the Society of Friends, and received his scholastic tuition, exclusively, at Sedbergh; having obtained his classical knowledge at the grammar-school of that place, under the care of the Rev. Dr. Bateman, and his mathematical acquirements, into the higher parts of which he advanced with great success, by the assistance of the celebrated Mr. Dawson. Being early distinguished by his studious disposition and the rapidity of his attainments, he was a favourite pupil with both his tutors, and was advanced by the former into the classes of his seniors, among whom he maintained his station by the excellence of his lessons and exercises. He became, ultimately, an accomplished classical scholar, and was deemed to excel his master in his

* Dr. Robert Willan, sen. graduated at Edinburgh, in 1745.

critical knowledge of Greek: Mr. Dawson likewise esteemed him one of the most successful students of the mathematics, among the numerous able pupils whom he instructed in that science†. The medical profession had long been determined upon as the object of his future pursuit, and he commenced his studies in that line at Edinburgh, in the autumn of 1777. After the usual residence of three years in that university, he received the degree of Doctor in 1780, when he published his inaugural dissertation, "*De Jecinoris Inflammatione.*" In the autumn of the same year he repaired to the metropolis, with the view of obtaining farther medical information, and attended lectures with great assiduity.

An arrangement had been made some time previously with Dr. Trotter; a relative, and a physician of some eminence at Darlington, in the county of Durham, but advanced in life; in consequence of which he intended to decline practice in that place in favour of his young friend, as soon as he had completed his studies. When in London, Dr. Willan was introduced to Dr. Fothergill, who, from a just estimation of his talents and acquirements, recommended him to try his fortune in the metropolis, and offered him his assistance. Dr. Fothergill, however, died in the month of December, in that year; and in the commencement of the following year, 1781, the death of Dr. Trotter also occurred; upon which Dr. Willan immediately went to Darlington, where he found two opponents already on the spot: one of these, the late Dr. Rotherham, was afterwards, for some years, Dr. Black's assistant at Edinburgh, and ultimately Professor of Natural Philosophy in St. Andrew's; the other, a gentleman whose name we have not learned, continued to reside there while he lived.

Dr. Willan remained at Darlington about a year; during which period he analyzed the sulphureous water at Croft, a village about four miles from that place; and wrote a small treatise respecting its chemical and medicinal qualities, containing also a comparison of its properties with those of the Harrogate waters. This tract was published by Johnson in

† A former Number of the Monthly Mag. is indebted to Dr. Willan for an account of Mr. Dawson.—EDITOR.

1782, with the title of "Observations on the Sulphur Water at Croft, near Darlington:" and a second edition was printed a few years afterwards. In the beginning of 1782, not deeming an establishment at Darlington worth contending for, Dr. Willan determined to return to London. The assistance of Dr. Fothergill was now lost to him; but he experienced much active friendship from Miss Fothergill, the doctor's surviving sister. His advantage, however, was greatly promoted by the establishment of the Public Dispensary, in Carey-street; which was opened in the commencement of 1783, and was chiefly accomplished by the exertions of some of his friends. He was appointed sole physician to it; and, under his humane and active superintendence, together with that of his able and benevolent colleague, Mr. John Pearson, the surgeon to the institution, the new Dispensary speedily flourished, and became one of the most extensive and respectable establishments of its kind in London. He resided, at this time, in Bartlett's Buildings, Holborn, with a family connected with the Society of Friends.

In March 1785, having passed his examinations before the College of Physicians, with great credit, he was admitted a licentiate of that body; on which occasion he addressed some congratulatory Greek verses to the board of Censors. About the year 1786, he engaged in the office of teacher, and delivered lectures on the principles and practice of medicine at the Public Dispensary. But his success, we believe, in this undertaking, was inconsiderable. Such attempts, indeed, have seldom proved eminently advantageous, except in connexion with the large hospitals; the reputation accruing from an attendance on these great schools, being deemed of almost equal importance to the future success of the student, with the knowledge to be acquired there. At a subsequent period, Dr. Willan received, as pupils at the Dispensary, young physicians who had recently graduated, and who were initiated into actual practice, under his superintendence, among the patients of the institution; a mode of tuition from which they derived much practical knowledge, and were gradually habituated to the responsibility of their professional duties. Upwards of forty physicians, almost all of whom have subsequently attained professional reputation, or

now occupy responsible situations, both in this country and abroad, have received the benefit of his instruction.

From the time when Dr. Willan settled in London, he pursued his professional avocations with an indefatigable industry and attention, of which there perhaps are few examples. He never quitted the metropolis for any consideration of health or pleasure during a period of thirty years. For many years he conducted the medical department of two dispensaries, (having subsequently been favoured with an appointment to the Finsbury Dispensary, in addition to that of Carey-street,) during which, his unremitting attention to the progress of the diseases which came under his care, is evinced by the prodigious collection of cases, which he has recorded in MS. mostly in a neat Latin style, in which he wrote with great fluency. From this assiduous and patient observation of the phenomena of disease, he doubtless acquired that acute diagnostic skill, which is the true characteristic of a sound physician; and which all, who have witnessed his practice, allowed him to have possessed in an eminent degree. This discriminative talent, indeed, has been sufficiently manifested in his great work "on Cutaneous Diseases;" but the delicacy of his tact, which enabled him to detect, like an accomplished artist, the minute peculiarities in the appearances of these diseases, which escaped the notice of ordinary observers, was very remarkable. During the whole of his career, he was not less assiduously employed in examining the records of medicine, both ancient and modern, than in the actual observation of diseases; of which the learning and critical acumen displayed in his publications, as well as the mass of manuscript collections which he has left behind, afford abundant proof. His habits of domestic privacy enabled him to dedicate a large portion of time to these researches; and, indeed, to the unabating ardor with which he applied himself to them, must be attributed that premature injury of his health, which shortened the period of his life.

The rise of medical reputation, unassisted by powerful connections, when all unworthy arts of advancement are disdained, must necessarily be very slow. For a considerable time it has no existence, even in the narrow circle of private friends, whose confidence is placed on older heads: and ultimately, it springs

but from the gradual accumulation of individual approbation, as the opportunities of meriting it from time to time occur.

“Crescit occulto velut arbor ævo
Fama —.”

Dr. Willan's advance to public reputation, and to the consequent emoluments of the profession, was, however, regularly progressive, though slow; and his publications, especially his *Treatise on the Diseases of the Skin*, upon which his posthumous reputation will principally rest, finally placed his professional character upon high ground. In the spring of 1791, he had the honour of being chosen a Fellow of the Society of Antiquaries. He had been early attached to antiquarian researches, and in his juvenile days had, with considerable industry and accuracy, collected, from the *Odyssey*, a history of the manners of the primeval times of Greece. Latterly he communicated some papers to the Society, of which, however, he declined the honour of publication; particularly a collection of provincial words, and an elaborate essay on the practice of “Lustration by Need-fire,” (scarcely extinct in some of the northern counties,) which led him into a curious and extensive research, respecting similar practices in ancient times, and the mythological superstitions connected with them. It was not until the month of February 1809, that he was elected a Fellow of the Royal Society.

The increase of his professional avocations, which had compelled him, some time before, to resign his office in the Finsbury Dispensary, led him, in the year 1800, to wish to lessen the fatigue of his duties at the Public Dispensary; and, accordingly, his friend and pupil, Dr. T. A. Murray, was appointed his colleague in that year. This active and intelligent physician, through whose exertions, aided by the Society for bettering the Condition of the Poor, the Fever Institution of the metropolis was established, was unfortunately cut off in February 1802, by the contagion of fever, caught in the infected apartments of the first patients who were admitted into the Institution. Dr. Willan, who had strenuously recommended this establishment, was nominated one of its physicians extraordinary. In December 1803, finding his private practice incompatible with a proper attention to the concerns of the Dispensary, which he had now superintended for

the space of nearly twenty-one years, he resigned his office. The governors of the charity, in testimony of their gratitude for his services, and esteem for his character, nominated him consulting physician, and made him a governor for life, and likewise presented him with a piece of plate, of the value of fifty guineas, inscribed with a testimonial of their attachment and respect*.

For several years previous to his resignation, Dr. Willan's fame and character had been fully established, and the emoluments derived from his practice very ample. He had, during the preceding course of years, resided, successively, in Ely Place, Holborn, and in Red Lion Square, in connection with the family before mentioned; and lastly, on his marriage in the spring of 1801, he settled in Bloomsbury Square. He was now not only generally consulted, especially by persons labouring under cutaneous diseases, but was also referred to on all occasions by his professional brethren, as the ultimate appeal on these subjects: for, however generally skilled in every other department of medical practice, his reputation for peculiar knowledge on this point had certainly excluded him, in some measure, from that universal occupation in his profession, to which he was so well entitled.

From his childhood Dr. Willan had been of a delicate constitution; his complexion in early life being pale and feminine, and his form slender. His extremely regular and temperate mode of life, however, had procured him an uninterrupted share of moderate health, and latterly even a certain degree of corpulency of person, though without the appearance of robust strength.

In the winter of 1810, some of his friends had remarked a slight shrinking of bulk and change in his complexion: but it was not till the following spring, that symptoms of actual disease manifested themselves. Being at this time accidentally

* This inscription was written by the late learned and reverend Dr. Matthew Raine, one of the governors of the Dispensary, and was as follows: "Viro integerrimo, artis scientiæque suæ peritissimo, Roberto Willan, M. D. ob felicissimam operam, in morbis ægenorum civium sanandis, viginti annos amplius gratuito et strenuæ navatum, ægrotantium apud Londinenses pauperum Patroni, amico amici, L. L. D. D. D., A. D. 1804, Preside Comité Sandvicense, collatæ pecuniæ Custode Gulielmo Waddington."

called upon to make some bodily exertion in assisting a patient, his respiration became oppressed, and he expectorated some blood. Soon afterwards he suffered two severe attacks of catarrh in immediate succession, which, as he did not desist from his professional avocations out of doors, did not readily subside, and left behind a considerable difficulty of breathing, which rendered the horizontal posture in bed insupportable; with sleeplessness, total loss of appetite, cough, hoarseness, and a very unequal and irregular state of the pulse; symptoms which seemed to imply an effusion of water into the cavity of the chest, and perhaps into the pericardium. The complexion now became exceedingly sallow, and the tunica conjunctiva of the eyes assumed a yellowish hue. With a view to obtain some respite from professional fatigue, as well as the advantage of a better air, he took a house, in June, 1811, at Craven-hill, about a mile from town, on the Uxbridge road, where he spent his time, with the exception of two or three hours in the middle of the day, when he went to Bloomsbury-square, to receive the patients who came thither to consult him. During the months of July and August, partly in consequence of the mildness of the season, and partly of the employment of some active medicines, and of the repeated applications of blisters, the cough and hoarseness were removed; but the other symptoms underwent little change; and the lower extremities became gradually, but at length severely, anasarcaous, from the feet upwards. A sudden unfavourable change of the weather, in September, occasioned a return of the cough and hoarseness, with some expectoration; and the probability of becoming phthisical, under the influence of an English winter, induced him to accede to the strenuous recommendation of some of his friends, and to undertake a voyage to Madeira. He accordingly embarked with his family in the Thames, on the 10th of October; and, after being fifty-three days on shipboard, detained by foul winds in the Downs and at Portsmouth, he arrived at Madeira on the 1st of December. During this interval, a considerable hardness and tumefaction took place in the abdomen, with an effusion of water into that cavity, and he was harassed by a dysenteric attack. By perseverance in an active course of medicine, however, after his arrival at Funchail, all the symptoms

were considerably alleviated; insomuch that, in the month of February, he meditated a return to the south of England in April. But this alleviation was only temporary: his disease was again aggravated; the dropsy, and its concomitant obstruction to the functions, increased; and, with his faculties remaining entire to the last, he expired on the 7th of April, 1812, in the fifty-fifth year of his age.

By the death of Dr. Willan, the profession was deprived of one of its bright ornaments, and of its zealous and able improvers; the sick, of a humane, disinterested, and discerning physician; and the world of an estimable and upright man. By his exterior deportment in public, indeed, he was far from rendering justice to his own character. His early education, his studious mode of life, and retiring disposition, prevented that display of his various and extensive knowledge, in mixed society, which delighted the privacy of a small circle of friends, and which was dispensed with much playfulness and simplicity of manner. In all the relations of domestic life, indeed, he was an object of general esteem and attachment. The gentleness and humanity of his disposition were equally conspicuous, in the exercise of his professional duties; in the patient attention with which he listened to the complaints of the sick, whom, in his fullest occupation, he never dismissed from his presence, dissatisfied with the brevity of his inquiries; and in the liberality with which he imparted his assistance, yet refused the remuneration to which he was entitled, when the circumstances of the patient appeared to render it oppressive. In his intercourse with his professional brethren, he was liberal and independent, and extremely tender of giving offence. As a practitioner, as we have already observed, he was a close and faithful observer of diseases, and by the peculiar quickness with which he detected their characteristic appearances, however obscured by complication, he had obtained a copious store of sound experience: yet it has been remarked, that he did not always prescribe with that vigour and decision which so much discriminative talent would have authorised.

As a professional writer, Dr. Willan appeared early, in his contributions to the periodical works. On his arrival in London, he became a member of a private medical society, which held

its meetings at a coffee-house, in Cecil-street, and which published two volumes of papers, under the title of "Medical Communications," in 1784 and 1790. In the second of these volumes he published the history of "A remarkable Case of Abstinence," in a hypochondriacal young man, which was interrupted for the space of sixty-one days, and terminated fatally. We believe that this was the only medical society of which he was ever a member.

Several communications from him were also printed in the London Medical Journal, edited between the years 1781 and 1790, by Dr. Simmons. In the fourth volume, page 421, a short letter of his appears, stating the character of a non-descript *Byssus*, found in the sulphureous waters of Aix, and differing from that which he had discovered in the waters of Croft and Dinsdale. In the sixth volume of the same Journal, he relates a fatal case of obstruction in the bowels, from constriction of the colon near the sigmoid flexure, which prevented any evacuation for upwards of thirty days before death; to which he appended some useful reflections on the diagnostic symptoms of these obstructions, as occurring in the large or in the small intestines. In the seventh volume, he describes the cure of a case of chorea, by the cuprum ammoniacum, which, however, he candidly acknowledges, in a subsequent publication, speedily recurred, and was cured by very different means. In the same volume he relates also a singular termination of abdominal dropsy, by a spontaneous discharge of the fluid per vaginam. And in the eighth volume he has given the detail of seven cases of ague, which were speedily cured by the preparation of arsenic, which had recently been recommended by Dr. Fowler. After the publication of the eleventh volume of this Journal, Dr. Simmons commenced a new series, under the title of "Medical Facts and Observations;" in the third volume of which a paper of Dr. Willan's appeared, containing a description of several cases of ischuria renalis in children, which was found to be connected with inflammation throughout the mesentery.

In the year 1796, Dr. Willan commenced a series of monthly reports, after the manner of those which Dr. Fothergill had formerly given to the public, containing a brief account of the state of the weather, and of the prevalent diseases in the me-

tropolis. The practice of a Dispensary, where the diseases of the poor, who are peculiarly exposed to the vicissitudes of the seasons, were observed on a large scale, was particularly favourable for ascertaining the existence of epidemics, and for estimating the state of the public health. By the additional scheme, which Dr. Willan devised, of presenting a monthly catalogue of the diseases which came under his care, the state of the general health was brought most distinctly under view. These reports were published in "*the Monthly Magazine*," which had been recently established, and were continued to the year 1800, when he collected them into a small volume, and published them in 1801, under the title of "*Reports on the Diseases in London*." This little work is pregnant with important and original medical observations, especially on points of diagnosis, which are the foundation of all rational and successful practice. "*Eum verò recte curaturum, quem prima origo causæ non fefellerit.*" But, from its unassuming pretensions and desultory arrangement, it has not been sufficiently known and valued by the profession: it never reached a second edition.*

We are unacquainted with the circumstances which originally drew the attention of Dr. Willan to the subject of cutaneous diseases. Most probably his own extreme accuracy made him feel early and acutely the vagueness and confusion of language, which universally prevailed in this department of medicine, while his attendance at a public institution brought many of these diseases constantly under his inspection. So early as 1784 and 1785, that accuracy led him to attend to the elementary forms of eruptions, if we may so speak, upon which he saw that a definite nomenclature could alone be founded, and upon which he erected the ingenious system developed in his large work. At that period, in his notes of cases, he has seldom designated eruptions by their ordinary names; but speaks of *papulæ scorbuticæ*, *eruptio papulosa*, &c. In 1786, his notes exhibit still more decisive proofs of the careful attention which he was directing to this subject, in the minute descriptions

* The monthly Magazine was also indebted to Dr. Willan, for many valuable anonymous papers.—EDITOR.

(accompanied by slight sketches with the pen,) of the forms, magnitude, and progress, of eruptions. The zeal with which he was at the same time investigating the original acceptation of the Greek, Roman, and Arabian terms, applied to eruptive diseases, is likewise manifested by his copious collections from authors, and by the occasional alterations of the nomenclature, applied in the cases, before he had finally determined on his arrangement. This was probably decided about the year 1789; as in the following year his classification was laid before the Medical Society of London, and honoured by the assignment of the Fothergillian gold medal of that year, to the author.

It is scarcely necessary to state here, that the ground-work of this arrangement is laid in the external characters, or what we have above called the elementary forms, of eruptions, which are distinguished in the outset by precise definitions; such are pimples, scales, rashes, pustules, vesicles, &c. Upon this plan alone can a perspicuous and intelligible classification be formed, as in other branches of natural history.

It was not till the beginning of 1798, that the first part of this work, including the *Papulous* eruptions, was published, in which, as in the subsequent parts, each variety was represented by a coloured engraving. In 1801, the second part, including the *Scaly* diseases of the skin, appeared; in 1805, the third part, comprising only two genera of *Rashes*, viz. measles and scarlet-fever; and, in 1808, the fourth part, comprehending the remainder of the rashes, and the *Bullæ*, or large vesications; the whole containing thirty-three plates, and comprising about half of the classification. Four orders, characterised by the appearance of pustules, vesicles, tubercles, and spots, remain unpublished; and, with the exception of the two first genera of pustular diseases, *Porrigo* and *Impetigo*, which have been long delayed from some impediments on the part of the engraver and publisher, the rest of the MS. is probably not at present in a state to meet the public eye.

In the interim, however, from the temporary interest which the investigation of the vaccine question excited, Dr. Willan was induced so far to anticipate the order of *vesicles*, as to publish, in 1806, a treatise "On Vaccination;" in which he also introduced the subject of chicken-pox (another *vesicular* disease,)

in consequence of the mistakes, which had been committed, in supposing that this was small-pox, when it occurred after vaccination. Two engravings accompanied this treatise, which exhibited the regular form of the vaccine vesicle, the imperfect vesicle, the three varieties of chicken-pox, and the ordinary *porrigo favosa* of the face, a disease, the origin of which had been falsely attributed to vaccination. Although six years have now elapsed since the publication of this volume, subsequent experience has added no fact of importance to the information which it contains;—another proof of the accuracy of Dr. Willan's observation.

Several years ago, Dr. Willan made a collection of observations, in about two thousand patients, with a view to an investigation of medical physiognomy, or temperaments, chiefly in regard to the diseases to which each variety of temperament is peculiarly predisposed, and to the operation of medicines on them respectively. In the prosecution of this inquiry, he procured several drawings (portraits) illustrative of the characteristic marks of the more striking varieties. He arrived at some interesting inferences respecting both the physical and moral constitutions, connected with these external characters, but he did not deem the matter sufficiently matured to lay before the public.

MEDICAL AND PHILOSOPHICAL INTELLIGENCE.

VACCINATION.

The following important statement, from the annual official reports of the Board of Health, with the account of persons vaccinated by the society for promoting vaccination, must be peculiarly interesting and conclusive, in respect to the benefits of this invaluable discovery. By the reports of the Board of Health, it appears, that there have died of inoculated and natural small-pox in the city of Philadelphia and its neighbourhood—

In 1807,	.	.	.	.	.	32 Persons
1808,	.	.	.	.	.	145
1809,	.	.	.	.	.	101
1810,	.	.	.	.	.	140
1811,	.	.	.	.	.	117
1812,	.	.	.	.	.	NONE.

In 1809,	1102	} Persons were successfully vaccinated by the Physi- cians of the Society for Promoting Vaccination, in the city and neighbour- hood of Philadelphia.
1810,	.	.	.	.	955
1811,	.	.	.	.	1277
1812,	.	.	.	.	1255
Total,	4589	

June 26, 1813.

Some Account of the German Universities.

[From the Edinburgh Medical and Surgical Journal, for April, 1812.]

The old, and once celebrated universities of Germany, are tumbling into pieces like the political institutions of the continent of Europe. Within these last two years, accounts have reached us, of the universities of Helmstadt, Altdorf and Rinteln having expired, and many others are fast approaching towards the same fate. Grieswald and Erfurt are nearly deserted, and Halle seems likely to be eclipsed by the splendid endowments of the newly arranged university at Berlin. The king of Prussia, "tired of war's alarms," has devoted his attention to the revival of learning, and the arts and sciences, in his capital. He has given a royal palace, for the purpose of forming spacious class-rooms for lectures, and he has established galleries for works of art, and museums of natural history. Professors and superintendents have been invited from the neighbouring uni-

versities; and medicine, like a wax nose, is to be moulded and fashioned into some new form, to attract the homage of students to the banks of the Spree. Reil has been induced to quit Halle for an appointment and salary adequate to his merit—he presides over the medical department, and was to commence his lectures this present winter. Hufeland, who has been resident at Berlin for several years, is also to deliver lectures on some branch of medicine and physiology. Bernstein is to teach surgery, Hermbstaedt chemistry, Wildenow botany, and Rudolph comparative anatomy and zoology. Professor Weiss, from Leipsic, is appointed superintendent of the mineral cabinet, and to lecture on mineralogy. Gottingen continues to flourish, we are told, under the auspices of King Jerome; and *Halle* is said to have experienced the patronage of his new Majesty and his ministers in a very distinguished manner. This last piece of intelligence interests us as Britons, watching over any attack upon public liberty, and as men of science, who recollect with pleasure their former acquaintance with the members of that once free and celebrated university. Halle has long been distinguished for its eminent professors in the departments of medicine. Stahl, Hoffman, and Gren contributed much to raise its reputation, which has of late years been well supported by the talents of Reil, Loder, Sprengel, Gilbert and others. We hope her star will not be eclipsed, by being forced into another sphere of motion. Whilst Halle remained under the government of Prussia, she enjoyed all the privileges of independence, by being left alone; the exertions of the professors were not damped by ample salaries, and the pursuits and opinions of the students were not checked by arbitrary regulations. In 1802, the total number of students at Halle, was estimated at 634; in 1805, the medical students amounted to 100, the students of theology to 200; but the most numerous class studied law, which comprehended the sons of noblemen and rich merchants, as well as lawyers, who were sent there for general education. There were no medical societies at which the young men met at stated times, consequently not much emulation or spirit of enquiry among them, though every new system of philosophy had its advocates and partizans. The examinations for conferring degrees are not limited to any particular time of the year; each student undergoes his examination for a degree

whenever he demands it; he only submits to one trial, which lasts two or three hours, and is attended by all the medical faculty. Four years is the usual period of study, before any application is made for a degree. The candidate defends a Latin thesis publicly, but this is generally written by one of the professors, and is merely *pro formâ*. The session for lectures, both in winter and summer, is like that adopted in our Scottish universities. There was no public hospital attached to the university seven years ago; the infirmary which belonged to the town, for the reception of sick poor, only contained twelve beds. The clinical establishment was founded upon a *nosocomium ambulatorium*, a species of dispensary, where patients were admitted and visited at their own houses. Cases were entrusted to the care of senior students, who drew up the history of the disease and the daily reports, which were submitted to the clinical professor, and he superintended the treatment, and occasionally visited the patient. In this respect, Berlin is better qualified for a school of medicine than Halle, for it has a large hospital, and good clinical wards.

Loder's museum, and his lecture-room, are under the same roof with his dwelling house. He lectures on anatomy, physiology, and surgery; and practises as physician, surgeon and accoucheur. His anatomical preparations are arranged in exquisitely neat order, in several rooms, according to the structure of hard and soft parts of animal bodies. They are very numerous, and many of the injected preparations singularly happy and beautiful. Many rare and important morbid preparations, from which drawings were made for publication, ought ere this time to have been made known to pathologists in this country, if the unfortunate state of public affairs had not stopped our peaceful communication with Hamburgh and Leipsic. There is another extensive collection of anatomical preparations at Halle, which was begun at Berlin by Meckel the first, and has been increased by the labours of his son and grandson. It occupies three large rooms, and is particularly rich in diseased specimens, which, probably, the present Professor Meckel will describe in the journal of morbid anatomy, that he announced two years ago.

Lectures on chemistry and natural philosophy, are given by Gilbert, the learned editor of *Annalen de Physik*. His laboratory is well furnished with chemical apparatus; he has models

and instruments of all kinds, many of them costly, and all of them purchased and collected by his own industry. It is to be hoped, after so many years labour, that it will not be deprived of that reward, which is justly due to his indefatigable exertions in his favourite study of chemistry, or want that best and most flattering encouragement which a numerous class of pupils can give to his zeal and ingenuity.

The public library is upon a large scale; the building is handsome, situated on an eminence somewhat inconveniently at one end of the town, with trees planted around it, and a row of busts of celebrated men in front. It contains a multitude of books, but complaints were made by the curators, of the difficulty in procuring English scientific works, they are so dear, and so rarely exported, and no less difficulty attends the getting books from Italy; but, in spite of these obstacles, the professors are acquainted, through the means of their reviews and periodical works, with every book that is published in the different nations of the world.

The botanical garden is a small one, but it is scientifically laid out by Sprengel, who lectures with great applause on botany. In our frequent visits to the professors, whose politeness and attention could not be exceeded, we frequently heard the praises of our country, not vaguely, but discriminately marked. The discovery of vaccination was more than once mentioned as the most glorious work of any age, and they could not help envying England the honour of having *Jenner* for her son and subject.

Perhaps there have been too many universities in Germany, and it may be serviceable to collect and concentrate the talent of the different states; but we fear the scourge of war will destroy many of the good with the bad; and though the privileged universities may be better supplied, being fewer in number, with the means of affording a scientific education, yet the destruction of so many seminaries, where the lectures, as well as the means of living, were cheap, may cut off many *routineers* from the practice of medicine, whose situation in society is very important, and whose condition has been in Germany of late years so much improved.

February 13th, 1812.

*Managers and Physicians of the Pennsylvania Hospital.**May 3, 1813.*

At a meeting of the contributors to the Pennsylvania Hospital, held this day, the following contributors were elected officers for the ensuing year:

Managers.

Samuel Coates,	Thomas Stewardson,
Pattison Hartshorne,	Thomas P. Cope,
Lawrence Seckel,	Reeve Lewis,
Zaccheus Collins,	Joseph S. Morris,
Joseph Lownes,	Samuel W. Fisher,
Edward Pennington,	Joseph Watson.

Treasurer.

Joseph S. Lewis.

The following contributors have been elected physicians of the Hospital.

Physicians of the House.

Thomas Parke,
Philip Syng Physick,
Benjamin Smith Barton,
John Syng Dorsey,
Joseph Hartshorne,
John C. Otto.

For the Lying-in Department.

Thomas C. James.

For the Out Patients.

Samuel Calhoun.

At a public commencement held in Philadelphia, the 1st of April, 1813, the following gentlemen received the degree of Doctor in Medicine, in the University of Pennsylvania, having previously passed their respective examinations, and defended the theses attached to their names, viz.

Massachusetts.

Nicholas C. Nancrede, on Inflammation.

John F. Waterhouse, on Leeches.

Joseph G. Nancrede, on Peripneumony.

New York.

Thomas B. Salter, on Suppressing Hemorrhage.

Lewis P. Gebbard, on Hydrophobia.

New Jersey.

Charles E. Pierson, on the Decarbonating Function of the Lungs.

James B. Elmendorf, on Cataract.

James Boyd, on Pulmonary Consumption.

Abraham Vanhoy, on Endemics and Epidemics.

Pennsylvania.

Thomas Billings, on Apoplexy.

George F. Lehman, on Biliary Calculi.

Morris C. Shallcross, on the Effects of Ardent Spirits on the Body and Mind.

Joseph Wilson, on Animal Heat.

John H. Gordon, on Polygala Senega.

Thomas L. Allen, on Hydropic State of Fever.

David Watson, on General Intellectual Derangement.

Mahlon Atkinson, on Cynanche Trachealis.

John N. Thomas, on Sleep.

Benjamin Burrell, on Scarlatina Anginosa.

Benedict D. Potts, on Resuscitation of Persons apparently drowned.

William Price, on Hare Lip.

G. W. Thomas, on Injuries of the Scalp.

James J. Hamm, on Apoplexy.

David J. Davis, on Fracture of the Os Femoris.

Maryland.

Alexander L. Griffith, on Intermittent Fever.

James Middleton, on Eupatorium Perfoliatum.

Benjamin Say Janney, on Consumption.

Caleb M. Jones, on Measles.

William Sloan, on the Preservative Principle.

Richard Marriott, on Dropsy.

Virginia.

- Uriel Terrill, on Sugar of Lead.
Robert Briggs, on Diabetes.
Pryor Quarles, on Gunshot Wounds.
Beverly Smith, on Dysentery.
Henry Brundige, on Hydrocephalic State of Fever.
Tingnal Jones, on the Operation of Medicine.
John C. Grosjean, on Dysentery.
William T. Scott, on Arsenic.
Robert P. Waller, on Cynanche Trachealis.
William H. Eggleston, on Hydrocephalus Internus.
Theodoric B. Dudley, on Digestion.
James W. Hunt, on Calculus.
Robert Murphy, on Menstruation.
Mann Page, on Injuries of the Head.
Samuel Patteson, on Convalescence.
John C. Ragland, on Sulphats.
John Meredith, on Gonorrhœa Virulenta.
Robert B. Barton, on Typhus.

North Carolina.

- Henry Lyne, on Camphor.
Maxwell Chambers, on Dyspepsia.

South Carolina.

- Thomas W. Robertson, on Repulsion.
Thomas T. Dupont, on the Sanguiferous System.
William R. Waring, Union of Power and Unity of Disease.
Jairus Farrington, on Dysentery.
P. P. Mazyck, on Leucorrhœa.
Joseph L. Stevens, on Love.
James Doughty, on Cholera Morbus.

Georgia.

- Charles Gignilliat, on Combustion.
Edward Brux, on Deleterious Gases.

Kentucky.

- John Croghan, on Diabetes.

Mississippi Territory.

- Alexander M'Ghee, on the Will.

METEOROLOGICAL OBSERVATIONS.

State of the weather at Philadelphia during the first six months of 1813.

JANUARY.

Thermometer—Lowest, at 8 A. M. 12. 30th day of the month.

Highest, at 3 P. M. 50. 2d

Mean, 30.

Winds—westerly, most prevalent.

Several snows, and good sleighing on the 30th.

FEBRUARY.

Thermometer—Lowest, at 8 A. M. 20. 2d day of the month.

Highest, at 3 P. M. 40. 28th.

Mean 32.

Winds—variable—northerly most common.

Several slight snows.

MARCH.

Thermometer—Lowest, at 8 A. M. 24. 8th day of the month.

Highest, at 3 P. M. 54. 23d.

Mean, 40.

Winds—variable, chiefly from the eastward. Two snows in this month. Thunder and lightning on the 1st and 18th days. Not much rain.

APRIL.

Thermometer—Lowest at 8 A. M. 40. 16th day of the month.

Highest, at 3 P. M. 70. 20th and 21st.

Mean, 55.

Winds—variable—mostly from the east and north.

Hail on the 11th—little rain—Thunder on the 4th and 14th.

MAY.

Thermometer—Lowest, at 8 A. M. 48. 7th and 8th days of the month.

Highest, at 3 P. M. 75. 24th and 25th.

Mean 58.

Winds—northerly winds rather prevalent, but very changeable—some heavy rain on the 14th. Thunder and lightning on three different days.

JUNE.

Thermometer—Lowest, at 8 A. M. 58. 1st day of the month.

Highest, at 3 P. M. 86. 18th.

Mean, 74.

Winds—westerly winds most prevalent.

Plentiful rains.—On the 16th at night, heavy rain and thunder, with very severe, incessant lightning. The wind blew an hurricane. Many houses, and a great number of trees blown down, within fifteen and twenty miles of the city. The wind first blew from the north east, but changed to the west. The fruits of the earth have been abundant, and the prospect of the grain harvest very favourable.

A malignant typhus fever appeared about the latter part of December, 1812, at Camden, in New Jersey, opposite to Philadelphia. It manifested itself under the deceptive forms of phrenitis—pneumonia—quinsey, and rheumatism. Nine or ten persons in succession, died of this disease, who were treated upon the presumption that it was of an inflammatory type.

A change of treatment, from the debilitating to the stimulating plan, which in many cases was necessarily urged to an unusual degree, and which was founded, principally, upon information derived from the work of Dr. Elisha North, on spotted fever, produced a striking and happy change in the result of a very large proportion of those cases, which subsequently occurred.

Some instances of the disease appeared in this city, about the beginning of February; but it was, for several weeks, principally confined to the Northern Liberties, and chiefly amongst the poor. It, however, gradually extended itself in different directions; being at its height, from the middle to the end of April, and has fallen under the observation of most of our practitioners; although few cases have occurred in the southern parts of the city.

The malignant typhus has also prevailed about Frankford, Abington, and Byberry, in Philadelphia county; in Bucks

county, and in various parts of New Jersey. After its decline in and about Philadelphia, on the approach of warmer weather, an unusual number of mild remittents occurred, which yielded readily to emetics of ipecacuana, cathartics and sudorifics.

Although the disease, as it has manifested itself in and about Philadelphia, has answered generally to the description given of it by Dr. North, yet the instances of pneumonia typhodes appear to have been more frequent with us than seems to have been the case in New England. It is, however, believed, that not more than one fourth of our sick have been affected with pneumonic symptoms. In some of the most malignant cases these symptoms have been entirely absent. These cases were ushered in with chilliness, fever, severe pains of the head and loins; in many, delirium—but in the most violent cases, a very unusual prostration of strength occurred on the first day, and returned at intervals, like the exacerbations of fever, which required the continued application of different powerful stimulants, in order to sustain life. The fifth appeared to be the critical day; but when the disease was combined with affections of the breast in weakly persons, who were subject to cough, it proved very dangerous.

We know of no cases at present in the city or its neighbourhood.

Philadelphia. DIED, on the 23d day of April, 1813, of a lingering illness, Dr. Benjamin Say, in the fifty-eighth year of his age.

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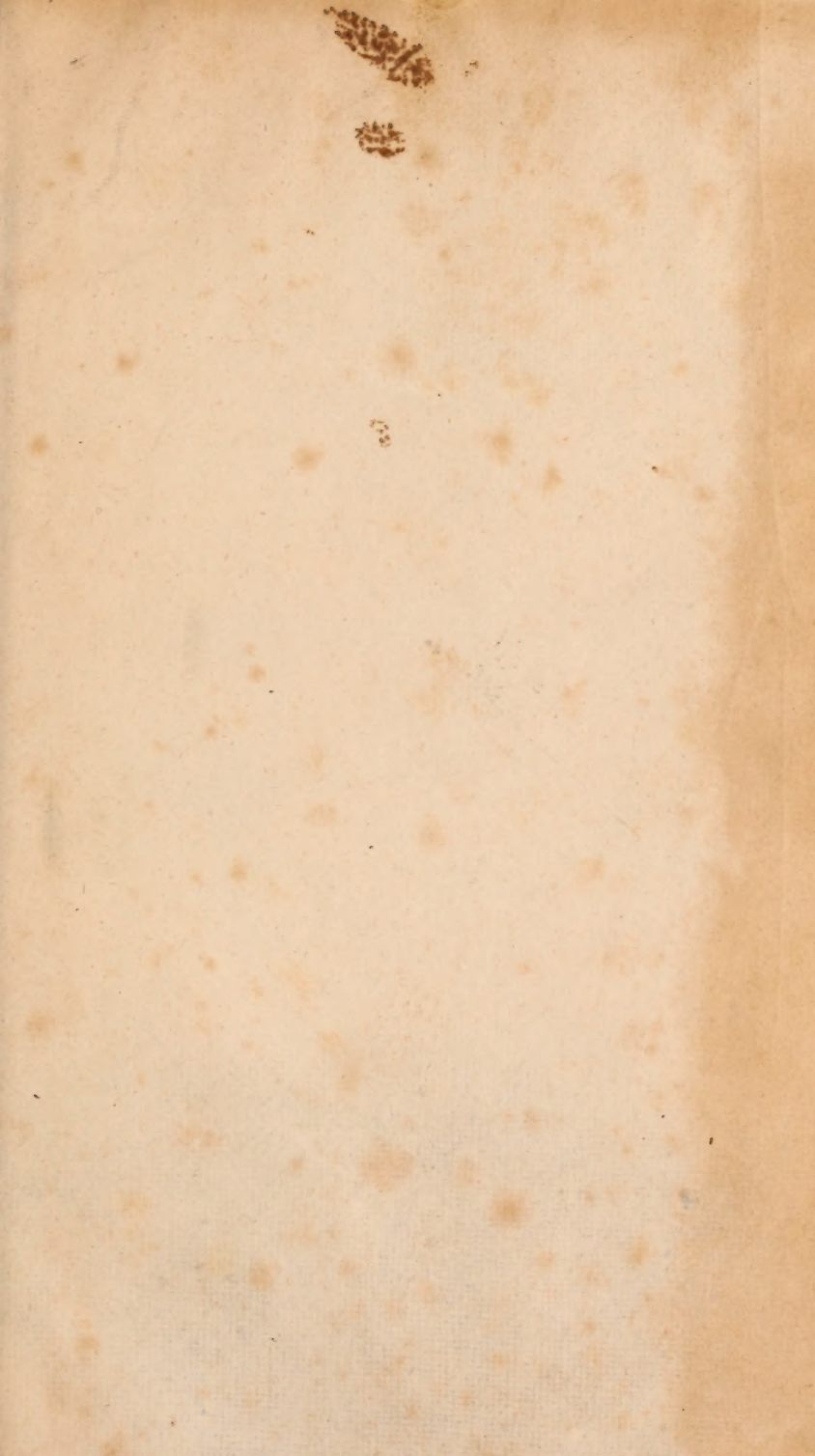
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